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Railway Age Gazette

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It is a matter of prime importance at the present time that locomotives be loaded to their full capacity. The larger

Tonnage Rating and the Road Foreman

the train units the more easily the tonnage can be handled, congestion will be relieved and more work will be obtained from the available power. The question has been raised as to whether or not the tonnage rating of locomotives is sufficiently high, especially where the rating is established by the mechanical department. The superintendent of the division can determine this for himself through his road foreman of engines. Here is a man, who from his extensive experience as a locomotive engineer, is in an excellent position to find out whether or not an engine is overloaded, underloaded, or is handling all that it is practicable to give it. The road foreman of engines has an important part to play in the transportation problem and this is particularly true under present conditions. He should be used where by virtue of his previous training he can do the most good. He should not be saddled with a mass of details and perfunctory work which may be done as well by others whose experience does not make them available for as important work.

The Interstate Commerce Commission has issued a new form for monthly reports of railroads to the Commission. One

Net Railway Operating Income

fundamental change which has been made is to make available figures for computing the return being earned on the investment after expenses, taxes and rentals have been paid. Heretofore railway operating income, which is the amount left from revenue after operating expenses, tax accruals and uncollectible revenue have been deducted was the figure used. The new form calls for equipment rents net, joint facility rent, leased road rent and miscellaneous rents to be shown and deducted from railway operating income to arrive at net railway operating income. In addition to giving the figure for investment in road and equipment at the beginning of the month each month, the railroads are also required to give the improvements of leased railway property at the beginning of the month. In other words, the Interstate Commerce Commission will have available for figuring return on investment the amount of investment in the company's owned

road and the amount invested in leased property, and on this total the Commission can figure the percentage of net railway operating income. This is a recognition by the Commission that rentals are a part of expenses analogous, apparently in the Commission's mind, to taxes and that they should properly be deducted before arriving at the amount available for return on total investment. This is obviously logical and proper accounting. There is, of course, the chance that some roads may be paying either too high or too low a rental as compared with the revenue which they are receiving from the operation of leased property. In the aggregate this would cause but a small error.

The completion of the Quebec bridge after two disasters marks a triumph in bridge engineering, yet the ultimate

The Quebec Bridge—A Sermon on Detail

success of this project has rested not so much on a spectacular struggle with well-nigh insurmountable difficulties, as in more or less prosaic effort to perfect the details of this great structure in all its parts. The story of this ill-fated project is a sermon on the importance of minute care in detail, since both of the disasters which befell it were brought about through oversight of seemingly minor features. In the first case it was carelessness in the revision of dead load calculations and in the proportioning of the lacing bars of the compression members. In the second case the design of the saddles by which the span was supported from the elevator hangers was at fault. Bridge engineering is essentially a matter of minute, painstaking detail. Imagination and vision play but a small part in the successful completion of even the most wonderful structure. One of the best illustrations of the importance of detail can be found in the field of movable bridges. In most of the types the fundamental principle is simplicity itself, but ultimate success involved years of experimentation. In one of the first types developed a period of 20 years elapsed after the first structure was built before a second one was attempted. The first one was a most indifferent success, while a greater perfection of working parts in the second led to the repeated use of this design in subsequent structures. Bridges of ordinary proportions built today are better than those of years gone by, not so much because new types or designs have been evolved, but because

greater care is taken in the proportioning of the details and closer attention is given to the perfection of the workmanship in the shop and in the field.

It is unfortunate that some mechanical department officers and foremen, who are hard pushed because of the difficulty

Explanations Will Not Solve the Problem

of keeping the equipment in shape owing to the lack of material and shortage of labor, have become discouraged and have adopted an attitude of "what's the use." It is little wonder, therefore, that one superintendent of motive power recently suggested to a subordinate that he "cut out the calamity howling, and get busy." This is no time to get discouraged and become fainthearted. The most difficult part of the task still lies before the railroads, and every possible effort must be made not only successfully to handle the heavy fall traffic, but to get the equipment into as good shape as possible for the winter. The railroads have accomplished wonders under the direction of their War Board, and the public is showing appreciation of this and is freely giving a large amount of co-operation. In spite of the shortage of men and material the mechanical department can make good in the months to come if it can be inspired and encouraged by the higher officers. There has possibly been too much of criticism and "please explain" and too little of friendly sympathy and encouragement—too little, indeed, of real appreciation for the importance and needs of the department. These are days of big things; men are successfully measuring up to bigger tasks than they ever dreamed of having to handle. The Railroad Y. M. C. A., as an example, had only a comparatively few days to organize its forces with a view to having a responsible representative with the necessary supplies on the great number of trains which took the men of the new National Army to the cantonments. Its leaders would hardly have been criticised if they had passed over this opportunity of serving the second contingent and had started their work on the third one. A representative of the *Railway Age Gazette*, when he returned from the meeting of the International Railroad Y. M. C. A. secretaries and their associates at which the final arrangements were made for this work, said: "I never saw such an enthusiastic bunch of fellows; nothing can stop them." Railway organizations must be thoroughly impregnated with this sort of spirit if they are successfully to overcome the stupendous task which confronts them. It is this spirit that dominates the railways of Canada and is responsible for the remarkable showing that they have made during the past few years in the face of almost insurmountable difficulties. This spirit cannot start from the ranks and work upward; it must start at the top and work down through the entire organization.

THE NEW MEMBERS OF THE COMMISSION

OWING to recent legislation authorizing the addition of two members to the Interstate Commerce Commission and to the death of Commissioner Clements, President Wilson has power to appoint three members of the Commission. The President has had this power for some time. The delay in exercising it may be due to the fact that he is making a special effort to find men who will not only be willing to accept appointment, but who possess the qualifications for membership on the Commission.

There never has been any difficulty in finding men who were willing to accept appointment to the Commission. During the time that the present three vacancies have existed, the politicians at Washington have brought to the President's notice a very large number of men who are quite willing to be appointed. Unfortunately very few of these have the special knowledge, the experience and the ability which members of the Interstate Commerce Commission ought to possess. Most of them are members of state commissions or men who

are or formerly were prominently identified with labor organizations.

The Commission is now composed of three lawyers, two former university professors and a former railway conductor who was a prominent labor leader. Those most directly concerned with the work of the Commission are the stockholders in railways, the business and agricultural interests and railway employees. While there is a former railway employee on the Commission, there are no former railway officers and no business men on it. Why should the banking interest have representation on the Federal Reserve Board, and the manufacturing and industrial interests representation on the Federal Trade Commission and the Tariff Commission, while the railways and the shippers and consignees of freight are left without representation on the Interstate Commerce Commission? The men who manage railways and those who produce and ship goods have to face payrolls and other business expenses. The problem of railway regulation is essentially a business problem. It seems obvious, therefore, that the Interstate Commerce Commission should be composed, to a large extent, of former railway officers and former business men.

Not only has President Wilson put business men on the Federal Reserve Board, on the Tariff Commission and on the Trade Commission, but he has drawn upon the best brains in business in the United States to help him in solving the problems presented to the government by the war. Let us hope that in appointing the three new members of the Interstate Commerce Commission he will follow the precedents which he himself has set in these other fields.

THE MARCH CONVENTION AND EXHIBIT

ALTHOUGH it is still six months before the time for the convention of the American Railway Engineering Association and the exhibit of the National Railway Appliances Association, the cancellation of meetings by a number of large railway associations has led some railway and supply men to question the advisability of holding this meeting and exhibit. Both of the associations are now proceeding on the assumption that their meetings will be held the same as in former years, but the fact that the question is being raised in both organizations indicates that a definite statement from the American Railway Engineering Association will clarify the situation and remove any ground for doubt. While at first thought it might perhaps be considered unnecessary for the American Railway Engineering Association to complete its arrangements for this convention at this early date, the National Railway Appliances Association is dependent upon the action of the Engineering Association for its guidance and it is important for the Appliances Association to know definitely where it stands in order that it may safely proceed with the negotiations for its exhibit space and incur other heavy expenditures. Many of the supply companies are also desirous of undertaking the preparation of their exhibits in the near future.

There would seem to be no reason why the American Railway Engineering Association should consider any plan other than the holding of its annual convention at the regular time and place. This society has been formed for the consideration of problems in the engineering and maintenance of way departments and the standing which it now has is an indication of the high character of the work it has done. The unusual conditions which the railways are now facing have created new and difficult problems for the members of this association, second in severity to those in no other department of railway service. These problems have arisen so quickly that time has not been available for detailed individual study and solution, and united effort is more necessary than ever before. There is, therefore, vastly more reason for the holding of the convention this year than at any previous period since the organization of the association.

An early decision on this matter is also essential, for to be of the maximum value to the membership, the program for the meeting should be changed radically. Under the organization in effect in the American Railway Engineering Association, the time of the convention is devoted almost entirely to the consideration of reports presented by standing and special committees on subjects assigned to them a year previous. In ordinary times this is an excellent method of procedure. This year, however, conditions have changed greatly since the subjects were assigned to the committees. Some of the topics selected are of engineering value at any time but have no particular application to present-day problems, while some of the most complicated questions are not covered in any way in the work now being done by the committees. The Board of Direction of this Association should give this situation serious consideration at the earliest possible opportunity, and should so alter the program that the members will be given that information which will be of the greatest value to them at present. This might require the postponing of entire reports of some committees and of portions of the reports of others. While this would be contrary to past practice, precedents are of little or no value in times such as the present. The railways themselves have made many revolutionary changes in their methods to meet the conditions which have arisen during the past year and the American Railway Engineering Association can do as much. Consideration of subjects such as methods of determining subsidence in embankments or secondary stresses and impact in steel bridges may well be deferred in favor of discussions of the labor problems, the reclamation and conservation of materials, the development of labor saving equipment and the conservation of cars in handling company materials. Elementary as subjects such as these may seem to some, they are the ones which are requiring the attention of railway men today to the exclusion of many more highly technical questions.

Owing to the cumbersome nature of committee work and the limited time before the convention, it may not be advisable to endeavor to secure committee reports on these timely subjects but to arrange for their presentation as individual papers by specialists in the respective lines. The important feature is to bring the desired information to the members either through committee reports or individual papers. Because of the intensity of the present problems the committee in charge of the annual dinner might also well consider the advisability of substituting addresses by railway men on current railway problems at the annual dinner for addresses on other than engineering subjects, as has been customary in the past.

With a large attendance assured by action of the Engineering Association (the Railway Signal Association having already provided for the holding of its stated meeting at the discretion of the Board of Direction) the National Railway Appliances Association will have an opportunity to present a more valuable exhibit than ever before. While the purpose of this exhibit is to display the products of the manufacturers before railway men and thereby to promote trade, the value of the exhibit to the manufacturers depends directly upon the extent to which the materials exhibited are of service to the railways. The situation in the supply field at present is very unusual. Some firms, particularly those handling products of steel, are so congested with orders that they are unable to accept further business except for long-delayed deliveries. Others are not so fortunate (or unfortunate) and are actively soliciting orders. There is no question but that the present labor situation will cause many railway men to study the exhibits more than ever before, searching for devices which will replace men and aid them to tide over the existing situation. The present, therefore, offers an exceptional opportunity to a large number of railway supply manufacturers to display their devices.

In brief the convention of the American Railway Engineering Association should be held as usual, but the program

should be revised to concentrate on the problems of today. The National Railway Appliances Association should proceed with its exhibit and the individual manufacturers should be encouraged to present those products which will aid the railways in meeting their present problems. The Associations should make a definite statement regarding the holding of the convention, and the exhibit, at once so that there may be no further uncertainty.

HOW THE FARMER TAKES REGULATION OF HIS BUSINESS

A LARGE part of the farmers of the country have long regarded railway stockholders and railway managers as very selfish and unreasonable, and as wanting in a proper public spirit, because they have resisted efforts to regulate railway rates in ways that the railway stockholders and managers have regarded as unfair. Persons purporting to speak for the farmers, especially those of the middle west, such as Senator LaFollette of Wisconsin, Clifford Thorne of Iowa, and so on, have also vigorously criticized the spokesmen of the railways and their witnesses in rate cases, on the ground that these representatives of the railways have "doctored" their statistics to make them show that the expenses of the railways were larger and their profits smaller than they really were.

It is an old saying that human nature is the same the world over, and the fact that human nature on the farms and in railway offices is very much the same is being amusingly and significantly exemplified by the attitude that many farmers and persons who volunteer to speak for them are assuming toward government regulation of the price of wheat, and by charges that are being made regarding the way spokesmen for the agriculturists are making up their statistics as to the cost of wheat-growing and the profits farmers are deriving from it.

The railway owners and managers frankly didn't like it when the government began fixing their rates. Neither do the farmers relish the action of the government in fixing the price of wheat. Furthermore, the farmers, like the railways, are trying to show that they can't live and prosper on what the government will let them have—the main difference between the situations of the two classes being that the railways are now receiving as low average rates as they ever did in their history, while the farmers are receiving prices for wheat that are unprecedentedly high.

The Kansas City wheat conference held a short time ago reckoned that to produce wheat this year cost \$2.71 a bushel. This is a startling figure, in view of the fact that the price fixed by the government is only \$2.20. How was this startling figure arrived at? We are told that "into the cost of wheat was figured interest on seed wheat, interest on the oats fed the horses, interest on investment, taxes, depreciation of farm machinery, and many other entirely proper items." But the Topeka Capital, published by Arthur Capper, governor of Kansas, intimates that the "costs" were padded. For example, the average production of wheat was assumed to be nine bushels to the acre. But the Statistical Abstract of the United States for 1916, page 123, shows that since 1866-75 the average production in this country per acre has never been less than 11.9 bushels; that in 1912 it was 15.9 bushels; in 1913, 15.2 bushels; in 1914, 16.6 bushels; in 1915, 16.9 bushels, and in 1916, 12 bushels. Governor Capper's paper says that "on the basis of a 15-bu. crop, the government has guaranteed a profit of 42 cents a bushel, or 27 per cent net profit over cost." Prof. G. E. Call, of the State Agricultural College of Kansas, is quoted as saying that on the average the American farmer is receiving \$1.21 profit when wheat sells for \$2, and \$1.41 profit when the government price of \$2.20 is obtained.

There are many farmers, and many men in public office, or who want to get into public office, who have been, and still

are, quite willing to assert that railway rates are high enough or even too high, in spite of the enormous advances in taxes, wages and other railway expenses which have occurred while rates have stood still or declined. They also presume to assert that if the railways with present rates aren't making enough money, it's the fault of their own managements; that all they need is to increase the efficiency of their operations—a thing which we are assured it would be very easy to do.

The *Railway Age Gazette* is much more modest than these people. We think we do know something about the railway business, but we would not venture to estimate what it costs to grow a bushel of wheat, or what price the government ought to allow to be charged for it. We do think, however, that the modest reserve we show in expressing opinions about agriculture might well be followed in future by farmers and their spokesmen who don't know a bit more about the railway business than we do about the farming business. Furthermore, we beg to call attention to the fact that in 1913, before the war began, with its consequent advances in wages and expenses of all kinds, the average railway rate per ton per mile in this country was 7.29 mills, while in 1916 it dropped to 7.06 mills, the lowest point ever known. On the other hand, in 1913 the average farm value of wheat in this country was 80 cents a bushel, in 1916 it was \$1.60, while the price fixed by the government is \$2.20. Would it be impertinent to suggest that, if the railways are to be required, with only a small increase in rates in eastern territory, and almost none at all in the rest of the country, to so increase their efficiency as to absorb all their increases in expenses, the farmers might also be asked to so increase their efficiency as to manage to worry along with a more than 100 per cent increase in the price of wheat?

The farmers have been mainly responsible for the unreasonable, unfair and drastic regulation to which the railways of the United States have been subjected during the last 10 years. They are now, in a great national emergency, being given just a little taste of the same medicine which they and the politicians they have chosen to represent them have been compelling the railways to swallow in large quantities for years. The regulation of railway rates, for which the farmers are mainly responsible, was bound to be used as a precedent for extending similar regulation into other fields. The *Railway Age Gazette* repeatedly has pointed this out, but persons in other lines of business, and especially the farmers, couldn't see it. Really, our farmer friends should accept price-fixing more gracefully, for it is merely the logical and natural application to their own business of a system which they have insisted on applying to the railway business. Furthermore, why shouldn't they be compelled to accept a price for their wheat which will barely yield them a "fair return on the fair value of their property," making no allowance in valuing it for the "unearned increment" in their land, or for investment in improvements that has been made from earnings? LaFollette, Thorne and all the rest of that crowd of politicians would confiscate all the investment from earnings and all the so-called "unearned increment" in the property of the railways. Now that we have got to regulating farm prices, we should, of course, proceed consistently and equitably, and do by the farmer as he would have the railway stockholder done by!

In view of the manifest dissatisfaction of the farmers with government regulation of wheat prices, perhaps they will be able in future to understand a little better and to sympathize a little more readily with the attitude of railway managers and stockholders toward government regulation of railway rates. The farmers are discovering that when government regulation reaches *them* it doesn't seem so entirely wise, and just, and beneficent, after all. Perhaps they will not be so keen for regulating other people's property to the point of confiscation when they discover that "curses are like young chickens, and still come home to roost."

Letters to the Editor

FROM A VEGETARIAN POINT OF VIEW

WASHINGTON, D. C.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

I have been impressed with your articles and editorials regarding food on dining cars, because in my travels principally on the Pennsylvania Railroad and the Southern Railway I have noticed what seems to me to be very small servings.

Perhaps my impressions are partially due to being a lacto-vegetarian. Meat eaters are more apt to slight the side dishes, giving particular attention to the main dish. Generally no two persons order the same, because appetites differ, but in the matter of essentials, such as bread and butter, toast, etc., the servings are niggardly. Breakfast foods, such as oatmeal, are served in unfairly small portions considering the cost of the material and the preparation of it. The Lackawanna plan of servings as shown by you recently affords opportunity for greater discrimination as to size of portions desired.

F. T. WHITTELEY.

UNNECESSARY TRANSFER OF LOADS

DENVER, Colo.

TO THE EDITOR OF THE RAILWAY AGE GAZETTE:

The loads of approximately 25,000 cars are transferred during each month throughout the United States to facilitate the repairing of defective cars. There is no doubt but that about half of these cars could be run safely to their destination with their defects and unloaded. As the matter now stands the receiving line is the judge as to whether or not the lading in the cars is to be unloaded, and inasmuch as the cost of transferring and the payment of the damage claim is made by the delivering line, it is of course natural for the receiving line to transfer the load whenever there is the slightest difficulty in making repairs, delays to the equipment being entirely overlooked.

We may figure that a car is held out of service about five or six days when its load is transferred, a great deal of the time being lost in switching the car to and from the repair track. This means that the railways lose the service of the car for six days. It would be a good plan, owing to the scarcity of equipment at the present time for the railways to agree to haul the cars which are received in bad order and which could be handled safely to their destination, at the rear of the train. There is no question but that the car shortage would be reduced by about 12,000 cars a month if this practice were followed. This number of cars would take care of a great many shipments. Instances have been found where loaded cars have traveled 1,000 miles in bad order, which upon arrival at an interchange point, about 40 or 50 miles from their destination, were held by the receiving line, request being made for authority to transfer the load so the receiving line would not be obliged to make the repairs.

It would appear that while cars are so badly needed on all lines, that the railroads should get together on this proposition and agree to run such equipment as is reasonably safe to handle. It would not only help the receiving line, but also the delivering line. Furthermore, it would save the receiving line the labor of transferring, and labor at the present time is about as scarce as the equipment.

WILLIAM HANSEN,
Chief Joint Inspector.

How the Railways Are Helping Win the War*

The Record of Their Achievements and the Efficiency They Are Showing Under Difficult Conditions

By R. H. Aishton

President, Chicago & North Western; Chairman, Central Department Sub-Committee, Railroads' War Board.

DURING the closing months of 1916 and the first quarter of the present year, the railroads were engaged in a tremendous struggle in their efforts satisfactorily to transport a traffic larger than any that they had ever before handled; a traffic which was not running in the usual channels of trade, but which was complicated by numerous unusual movements, both of munitions and supplies, and of fuel, coupled with one of the worst winters known to the railroad fraternity.

I think that the executives of the railroads had generally recognized that sooner or later the United States would actively enter the war, and that when that time came it would not only increase the very large amount of traffic to be handled, but would also add to the complexity of the railroads' problem in handling it.

They knew that on the railroads must fall the burden of promptly and satisfactorily handling the military traffic of the nation, to enable it to perform effectively its part in the war, and that to satisfactorily handle the military traffic would require the greatest co-operation between the railroads and the military authorities; also that any failure on the part of the railroads to handle the great commercial traffic would be disastrous to the industries and commerce of the country and would interfere seriously with the prosperity of the country and necessarily impair their effectiveness as concerns the carrying on of the war.

PROMPT ORGANIZATION OF THE RAILWAYS

War was declared on Germany on April 6. Five days later, on April 11, at a meeting of the chief executive officers of most of the important railways, in Washington, and at the suggestion of the Council of National Defense, an agreement of historical interest was entered into, and when the history of this war is written, it is hoped that this agreement will be given the place of prominence that it deserves, for in this agreement the railroads of the United States, great and small, 631 in number, acting through their chief executive officers there assembled, and stirred by a high sense of their opportunity to be of the greatest service to their country in the present national crisis, pledged themselves to do certain things. They "pledged themselves with the government of the United States; with the governments of the several states; and with one another; that during the present war they will co-ordinate their operations in a continental railway system, merging during such period all their merely individual and competitive activities in the effort to produce a maximum national transportation efficiency." To this end they agreed "to create an organization which shall have general authority to formulate in detail and from time to time a policy of operation of all or any of the railways, which policy when and as announced by such temporary organization, shall be accepted and earnestly made effective by the several managements of the individual railroad companies here represented."

By another resolution adopted at the same meeting, the railways agreed "to the direction of the executive committee in all matters to which its authority extends, as expressed in the resolution heretofore adopted."

For two years prior to this meeting, a committee had existed known as the Special Committee on National Defense

of the American Railway Association, formed primarily to co-operate with the government in the mobilization of troops on the Mexican border, and also to consider the general problem that would be presented in case we should become involved in the great war; but the activities of this committee were confined to co-operation in military affairs. What more natural, than at this meeting of the executives in Washington they should create an Executive Committee of this Special Committee on National Defense?

This was done, and five railway executives were nominated and elected, and it is this committee which has since become known as the Railroads' War Board.

A REVOLUTIONARY STEP IN RAILWAY HISTORY

This was probably the most important and revolutionary step ever taken in the history of our railways. By placing the operation of all of their facilities under the direction of a single committee of five, it constituted them to all intents and purposes for the period of the war, a single railway system. At the same time it placed the service of this great railway system unreservedly at the disposal of the government.

The railways of this country have one-third of the total railway mileage of the globe. They have a greater mileage than all of the railways in the world that are now owned and operated by governments. They have about 260,000 miles of lines; about two and one-half million freight cars; 56,000 passenger cars; and over 65,000 locomotives. They have 1,750,000 employees.

Therefore, by this act, this great railway system with all its facilities, was made to serve the government in this crisis as completely as if it had owned them; and at the same time the government was spared the expense of buying the roads and the responsibility and labor of managing them.

Perhaps the most significant feature of the matter was that this act on the part of the railways was purely voluntary. No law required it. Another of its very significant features was that the step was taken without any prospect of special consideration or compensation having been held out by the government. In England the railways have been united for operating purposes during the war into a single system, but there this action was required by law, and each railway was guaranteed the same net return that it had earned before the war began.

The individual companies composing our railway system, through the organization formed by themselves, placed their facilities at the service of the government without any understanding or promise that if this resulted in loss to any individual line, this loss would ever be made good.

HOW MILITARY TRANSPORTATION HAS BEEN CONDUCTED

The two great purposes in forming this organization were to enable the railways to meet promptly and satisfactorily all the military transportation needs of the government, and at the same time to so increase their efficiency that in spite of the large amount of military business they would be called upon to handle, they would be able satisfactorily to move the commercial traffic of the country. What success have the railways had in accomplishing these purposes?

In connection with the movement of military traffic, I believe that it might be said, that up to the present time the railways have been able to render a satisfactory service. Six-

*From an address before the St. Louis Railway Club, September 14, 1917.

teen military cities or cantonments have been built by the government to house the 687,000 citizen-soldiers selected for service by the draft. Colonel I. W. Littell was in charge of the construction of these cantonments for the United States government, and on September 5, 1917, Colonel Littell issued a statement regarding this work in which he said:

"In the construction of the cantonments to date, over 50,000 carloads of material have been transported to and delivered at the sites, an enormous tax upon the already overburdened railroads' facilities of the country. The railroads, however, have given splendid service. All government orders have been given precedence and the lumber and other supplies needed have been rushed to the cantonments in record time."

Of the 16 cantonments, seven were ready on September 5 to receive their entire quota of officers and enlisted men; seven others were ready to receive all their officers and two-thirds or more of their quota of enlisted men, while the two remaining ones already had received and were taking care of their full quota of officers. A typical layout such as is used for accommodating the officers and men at a cantonment comprises in round numbers 1,500 separate buildings, requiring approximately thirty million feet of lumber. Each cantonment has a complete system of water supply and sewerage disposal, the piping alone for this amounting to more than fifty miles. Besides moving the material and men for the construction of those cantonments, the railways have been moving vast quantities of other materials for government military purposes and also large bodies of troops.

They are now moving the 350,000 members of the National Guard to the training camps and between September 5 and September 9 they moved 35,000, or approximately 5 per cent of the men selected in the first call for the new National army. They will be called upon to move about 275,000 of these men beginning about September 19; and another 275,000 beginning October third. Another 100,000 will have to be moved beginning October 17. The government has been put to no serious delays or trouble in the handling of these large bodies of troops and with the experience we already have had, there is no reason for believing that it will encounter any in the handling of those who are yet to be moved.

IMPROVEMENT IN COMMERCIAL TRANSPORTATION RESULTS

It should be borne in mind in considering what this indicates as regards railroad efficiency, that the railways of the country are today handling both the largest commercial passenger traffic and the largest commercial freight traffic that they ever did in their history.

Have they, in spite of this, been successful in accomplishing the second purpose for which their present organization was formed; viz., that of so increasing the efficiency with which their existing facilities are utilized as to enable them satisfactorily to handle the commercial business of the country? You will recall that on May 1, less than a month after the railways began to operate under the present arrangement, the excess of requisitions for freight cars over what the railways could supply—the so-called "car shortage"—was 148,627 cars. Since that time, the total freight traffic handled has shown large increases. The railways handled 16 per cent more freight traffic in May, 1917, than they did in May, 1916, and 23 per cent more in June, 1917, than they did in June, 1916. This occurred in spite of the fact that the traffic in the year 1916 far exceeded any ever moved before. In spite of this phenomenal increase in freight traffic, the railways had succeeded on September 1 of the current year, in reducing the unfilled requisitions for freight cars about 80 per cent, or down to 31,591 cars. This remarkable result was partly due to the exercise of the power vested in the Commission on Car Service to order freight cars sent from places where they had accumulated in undue numbers to sections of the country where they could be used to better advantage. Between May 1 and August 30, the Commission on Car Service ordered 113,420 freight cars sent from certain railways to others; chiefly from Eastern lines to lines in the

West, Southwest and Southeast, where they were needed to move the huge quantities of lumber required for the construction of the cantonments, for the handling of crops, and so on.

It is believed that the continued exercise by the Commission on Car Service of its large authority will prevent in future such accumulations of cars at ports and in terminals as caused the great congestion of traffic over a year ago.

The success which has been attained in handling the enormously increased traffic, while actually reducing the unfilled car requisitions, has been mainly due, however, to increased efficiency on the part of the railways all over the country, and to the remarkable co-operation they have received from shippers in loading cars more heavily and in loading and unloading them more promptly. Statistics which have been compiled for railways having a total mileage of 196,000 miles show that in June, 1917, the railways handled 23 per cent more freight traffic than they did in June, 1916, with only 1.8 per cent more freight locomotives in service, and only 3.2 per cent more freight cars. This indicates, without doubt, an increase in the efficiency with which locomotives and cars are being handled, which certainly is highly creditable both to the managements of the railways and to the shipping public, who have co-operated with them so patriotically and loyally.

THE TREMENDOUS INCREASE IN FREIGHT TRAFFIC

Extremely few people have any conception of the magnitude of the problem with which the railway managements have been confronted by the enormous increases in traffic within the last two years. If more people understood this, there would be less criticism because there have been shortages of cars and more appreciation of the remarkable increases in railway efficiency which have been made, and which have had to be made in order to prevent the congestions and car shortages from becoming very much more serious. Let me give an illustration of the most striking kind regarding both the increase in freight traffic and the increase in the efficiency of operation which have had to be made in order to handle this increased traffic.

Our railways have only a very small number more miles of line, track, locomotives and cars than they had in the fiscal year which ended on June 30, 1915, two years ago. In the calendar year 1916, however, before the present organization for operating the railways as a single system was formed, they handled 31 per cent more ton miles of freight traffic, according to the best estimate that can be made, than they did in the fiscal year ending June 30, 1915; and at the present rate of increase it appears probable that in the calendar year 1917, they will handle at least 15 per cent more ton miles of freight than they did in the calendar year 1916. This will make an increase in the freight traffic handled in the calendar year 1917, as compared with the fiscal year ending June 30, 1915, of 141,000,000,000 ton miles, or 52 per cent. Stated thus baldly in statistics, this increase may not appear to you as very significant, but I will state it in terms which will make it more significant.

If, during the rest of the calendar year 1917 the railways of the United States handle a traffic relatively as much larger than that of the fiscal year ended on June 30, 1915, as that which they have thus far handled during the current year, the increase in freight traffic handled by them over that handled by them in the fiscal year 1915 will be greater than the total freight traffic moved annually before the war by the combined railways of Germany, France, Russia, Spain, Sweden, Switzerland, Roumania, Holland, Canada, South Africa, Mexico, Japan, Brazil and New South Wales. In other words, the railways of the fourteen countries I have mentioned handled before the war a total of 141,000,000,000 ton miles of freight a year, while in the year 1917 the increase in the freight traffic of our railways alone over that of the fiscal year 1915, will be about 141,000,000,000 ton miles.

These figures give some idea of how much more vast is the railway system of the United States than that of any other country, as well as of the increase in freight traffic which has occurred within the last two years, and of the increase in the efficiency of the operation of the railways in this country; for as I have observed heretofore, this tremendous increase in traffic is being handled with a relatively small increase in facilities.

Stated in tons instead of ton miles, the increase in traffic in the calendar year 1917 over the fiscal year 1915 probably will be close to 510,000,000 tons. On the basis of the number of tons now being handled per train, it would take 720,000 trains, containing 18,000,000 cars, to hold this increase in tonnage. If all of these cars were made up into a single train it would be 136,363 miles in length.

Is it any wonder, in view of such facts, that there have been, and probably will continue to be, some congestions and delays?

There are some people who use the evidence of recent increases in railway efficiency as a basis for criticizing our railways. They say that such figures show that the railways were inefficiently operated before, and that a corresponding increase in efficiency ought to have been accomplished before we entered the war. Those who are really familiar with railway affairs in this country know how utterly without foundation such criticisms are. In the first place, it is easy to demonstrate that the railways have been steadily increasing the efficiency of their operations. If they had not been, the advancing wages, prices and taxes to which they have been subjected, together with the kind of regulation of rates which they have had to bear, would long since have bankrupted most of them.

In the second place, they never had such an opportunity to increase the efficiency with which they use their facilities as they have had since this country entered the war. They have been allowed since then, to operate, in so far as they have found it expedient, as a single system, while before we entered the war, the railways were prevented from doing this by the Sherman law.

They have also been able, since we entered the war, to secure an amount of effective co-operation from all shippers, large and small, in the country, that they never were able to obtain before; and in this same connection, the helpful and co-operative efforts of a number of the public service commissions in the various states, which early realized the situation confronting the railways and the necessity for increasing their efficiency, and which have used tremendous influence with the shippers and the public to bring about the elimination of delays to equipment; proper loading of equipment; and all of the various things of that kind that tend to increase the railways' efficiency; and by the weight of their influence they have been most helpful to us.

Within the past few days, the Public Utilities Commission of Illinois called a meeting of the railroads to find out in what manner they could be of the most help; and as a result of that meeting during the last 48 hours they have given publicity to some of the most helpful ideas on this subject.

It is certainly the irony of fate that the increase in the railways' efficiency, which they are making for the purpose of serving the country, should be adopted by certain persons as a ground for criticizing them.

RAILWAYS WILL SUCCESSFULLY PERFORM THEIR TASK

When we have briefly reviewed what has already been done by the railways in the war, our minds naturally turn to a consideration of what they probably will be able to do in the future. From present indications, it seems probable that the demands made upon them by both military and commercial traffic will continue to increase for a considerable time.

They probably will be called upon to handle a heavier

traffic during the next fall and winter than they ever have been before. In some respects the difficulty of handling this traffic will increase.

One serious problem with which the roads are confronted is the labor problem. They have raised nine regiments of railway men for the government, which are to be used in connection with military transportation in France. Not a few of their competent officers have gone into the service of the government. A considerable number of their employees have been selected for the new national army; and as more men are selected, the number of railway men who will leave the service of the railways to enter that of the government will probably increase.

As a concrete example, on the railroad with which I am connected (the Chicago & North Western), with a system of about 9,000 miles, already 820 of our men have voluntarily enlisted in some branch of the government military service. Out of a total of approximately 40,000 employees, 15,000 registered for the new selected national army, and while it is true that a great many of them have dependents, or secure exemption for some other reason, at the same time this will illustrate to you one of the phases under which the railways are struggling.

The labor problem was acute before we entered the war, and it is probable that it will grow more serious as the war progresses.

The problem presented by the situation as respects the securing of materials and equipment is also serious. Materials and equipment of all kinds have greatly advanced in price, and it is difficult to get many kinds at any price. The result is that not only is the problem of moving the freight a very difficult one, but also the problem of maintaining roadway and equipment is a very difficult one.

In spite of all of these circumstances, it is my confident belief that the splendid spirit of the officers and employees of the railways of this country, manifested in so many helpful ways; the helpful and co-operative attitude of the public, and of the various commissions, both state and federal; the support of the press; coupled with the effective organization of the railways themselves, will successfully meet any task that may be set before them to perform.

To accomplish, this, however, we must be able to continue and to increase the co-operation of the shipping public in connection with the increased loading of cars; expediting their movement, etc.; and to continue to maintain the active interest of the various public authorities and commissions; and to have tendered to us by our employees willingly, the most energetic and efficient work that they are capable of doing. To secure all of these things and to retain them when once secured is your task and mine and the task as well, of every railway officer the whole length and breadth of the United States. The railways at this time need more than ever the forbearance and co-operation of the general public and of the regulating authorities.

For the purpose of saving coal and also making as many employees available for freight service as practicable, the railways already have made reductions in their passenger service at a rate exceeding twenty million passenger train miles annually, and they may have to make still further large reductions later on. The managements are as reluctant to do this as the public is to have them do it, and they hope that the public will recognize it as a war measure, and will bear patiently the inconveniences which may result.

With loyal and energetic service from their employees, with continued effective co-operation from the shipping public; and with a public sentiment which will be intelligently sympathetic with what they are trying to do; I repeat again, that there is no good reason for doubting that the railways will be able to accomplish the great task which they have set before themselves; although it will not be accomplished without great effort and without great sacrifices on the part of

those connected with the railways and those who use railway service.

The emergency confronting the government and the nation is greater than any emergency that can confront any private individual or corporation; and we, representing the transportation interests of this country, must stand together and co-ordinate all of our activities to one end; the *early and successful termination of the war*.

The vast transportation interests of this country are, for this purpose, standing together and laboring uniformly for this common end, and it requires a powerful guiding hand to secure uniformity of action where so many interests are involved; and this hand has been, and will continue to be, wielded by the Railroads' War Board, until the nation so loved by us all has definitely and triumphantly attained the end of the voyage on which we are now embarked, viz., the making of the world safe for Democracy.

RAILWAY RETURNS FOR THE CALENDAR YEAR 1916

The Bureau of Railway Economics has issued a bulletin, No. 114, giving a summary of the principal railway statistics of Class 1 roads for the calendar year 1916. This is the third in a series of publications for the purpose of presenting as soon as possible after the close of the year the significant statistics of the more important railways compiled from their annual reports to the Interstate Commerce Commission. This is the first annual compilation of the bureau under the commission's order changing the fiscal year.

The Class 1 roads, those having gross earnings of over \$1,000,000 for the year, include approximately 89 per cent of the railway mileage of the country and 97 per cent of the operating revenues. Emphasis is laid in the introduction to the bulletin upon the fact that the figures are preliminary and in some cases liable to correction and adjustment. Comparisons with the preceding year are attempted only in the case of the income account because of the change of the fiscal year. No account is taken of intercorporate duplications arising out of the relations between the operating roads of Class 1 and the smaller operating roads and non-operating companies. An effort is made, however, to present an approximate statement of the property investment of Class 1 roads, including the investment of all non-operating subsidiaries whose properties are operated by the roads of Class 1. Using this figure as a basis, the operating income for the year represents a return of 6.38 per cent upon the investment.

An average operated mileage of 230,486 miles of line is represented in the statistics. The income account, with comparisons for the previous year, is as follows:

Item	Year ended December 31		Increase 1916 over 1915
	1916	1915	
Railway operating revenues.....	\$3,592,591,023	\$3,061,621,651	\$530,969,372
Railway operating expenses.....	2,354,548,724	2,053,364,924	301,183,800
Net operating revenue.....	1,238,042,299	1,008,256,727	229,785,572
Railway tax accruals.....	156,875,396	137,398,653	19,476,743
Uncollectible railway revenues..	795,359	792,163	3,196
Railway operating income..	1,080,371,544	870,065,911	210,305,633
Miscellaneous operating income..	3,039,951	1,566,817	1,473,134
Total operating income.....	1,083,411,495	871,632,728	211,778,767
Non-operating income	270,042,677	230,733,050	39,309,627
Gross income	1,353,454,172	1,102,365,778	251,088,394
Deductions from gross income:			
Interest on funded debt.....	404,566,382	396,633,221	7,933,161
Interest on unfunded debt....	14,940,456	19,814,945	d 4,874,489
All other deductions.....	288,418,129	229,531,459	58,886,670
Total deductions	707,924,967	645,979,625	61,945,342
Net income	645,529,205	456,386,153	189,143,052
Disposition of net income:			
Dividend appropriations	187,884,557	176,599,800	11,284,757
Income appropriated for investment in physical property..	62,507,009	31,742,204	30,764,805
Other income appropriations..	35,122,052	12,904,834	22,217,218
Total appropriations of income	285,513,618	221,246,838	64,266,780
Balance to credit of profit and loss	360,015,587	235,139,315	124,876,272

d Decrease.

The total capital securities outstanding on December 31, 1916, not excluding duplications resulting from intercorpor-

ate relations, amounted to \$16,140,137,007, and the total property investment (estimated) amounted to \$16,974,809,-871. The increase in the investment of Class 1 roads themselves during the year was \$365,468,359, of which \$39,939,-000 was for new lines and extensions, \$322,394,000 for additions and betterments on owned lines and \$3,135,000 additions and betterments on leased lines. The equipment in service on June 30 included 60,945 steam locomotives, 322 other locomotives, 2,277,170 freight train cars, 52,145 passenger train cars, and 97,112 company service cars.

The number of general and division officers during the year was 17,366 and their total compensation was \$53,200,-749. The total number of employees, excluding general and division officers, was 1,664,852 and their total compensation was \$1,348,773,274, an average of \$868.

In the following table are given some of the principal averages and ratios.

AVERAGES PER MILE OF LINE:	
Operating revenues	\$15,587.00
Operating expenses	\$10,215.57
Net operating revenue	\$5,371.43
Taxes	\$680.63
Operating income	\$4,687.36
Freight revenue	\$11,097.44
Passenger revenue	\$3,063.73
Passenger revenue	\$3,063.73
Freight train-miles (freight train density)	2,676
Passenger train-miles (passenger train density)	2,492
Total revenue train-miles (train density)	5,300
Total revenue locomotive-miles	7,452
Total freight car-miles	100,857
Total passenger car-miles	14,832
Revenue ton-miles (freight density)	1,571,175
Revenue passenger-miles (passenger density)	150,002
AVERAGE PER MILE OF MAIN TRACK:	
Freight revenue	\$9,644.15
Passenger revenue	\$2,662.52
Passenger service train revenue	\$3,355.01
AVERAGE PER TRAIN-MILE:	
Operating revenues	\$2.94
Operating expenses	\$1.93
Net operating revenue	\$1.01
AVERAGE PER FREIGHT TRAIN-MILE:	
Freight revenue	\$3.96
Loaded freight car-miles (loaded cars per train)	25
Empty freight car-miles (empty cars per train)	11
Total freight car-miles (cars per train)	36
Revenue ton-miles (tons per train)	560
AVERAGE PER PASSENGER TRAIN-MILE:	
Passenger revenue	\$1.17
Passenger service train revenue	\$1.47
Passenger car-miles (cars per train)	5.8
Revenue passenger-miles (passengers per train)	57
AVERAGE PER FREIGHT CAR-MILE:	
Revenue ton-miles (tons per loaded car)	23
Revenue ton-miles (tons per car)	16
Freight revenue—cents	16.13
AVERAGE PER PASSENGER CAR-MILE:	
Revenue passenger-miles (passengers per car)	16
Passenger revenue—cents	31.79
MISCELLANEOUS AVERAGES AND RATIOS:	
Operating ratio (per cent)	65.54
Average haul per ton—revenue freight—miles a	166.73
Average journey per passenger—miles a	34.37
Average receipts per ton-mile—cents	7.06
Average receipts per passenger-mile—cents	2.042
Average tractive power per locomotive—pounds	33,194
Average capacity per freight car—tons	41
Average seating capacity per passenger car—coaches only	68

a On the individual railway.

USE OF BRITISH CANALS URGED.—In a letter to various local authorities the Canal Control Committee of England urges the use by manufacturers, merchants, exporters and importers of the inland waterways of the country for the conveyance of all kinds of traffic which can be so carried, in view of the fact that the railways are so severely taxed through depletions of staff for the army, while they have to deal with an increased volume of traffic. The committee states that the necessity of affording them relief by such diversion is urgent. To assist it the committee has appointed three sub-committees—the Northern, Midland and Southern—with offices at Leeds, Birmingham and London, respectively, which will each, with an independent chairman, be composed of representatives of canal companies and of carriers, in addition to official representatives of the War Office, Ministry of Munitions and Railway Executive Committee. These committees will exercise control over the canals in their districts.

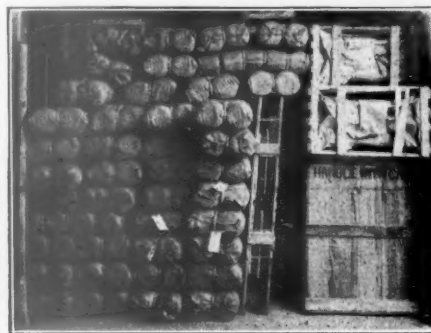
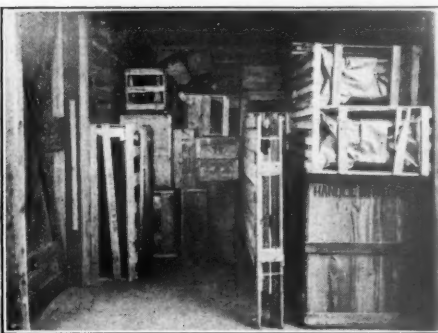


A Successful Campaign on Claim Reduction

A Description of Methods Adopted by the Santa Fe to Decrease These Payments and of the Results Secured

By Charles E. Parks

Assistant Editor, The Santa Fe Magazine, Chicago.



Four Stages in the Proper Stowing of L. C. L. Freight

PREVIOUS to 1908, the Atchison, Topeka & Santa Fe, in common with most of the other railroads of the United States, had made no centralized or systematic effort to reduce the payment of claims growing out of loss and damage to freight. All attempts in this direction had been of a personal nature, depending upon the ambition of an officer to make a showing relative to the amount of the claim payments in his territory. When a reduction was brought about, this result could be traced to a number of reasons,

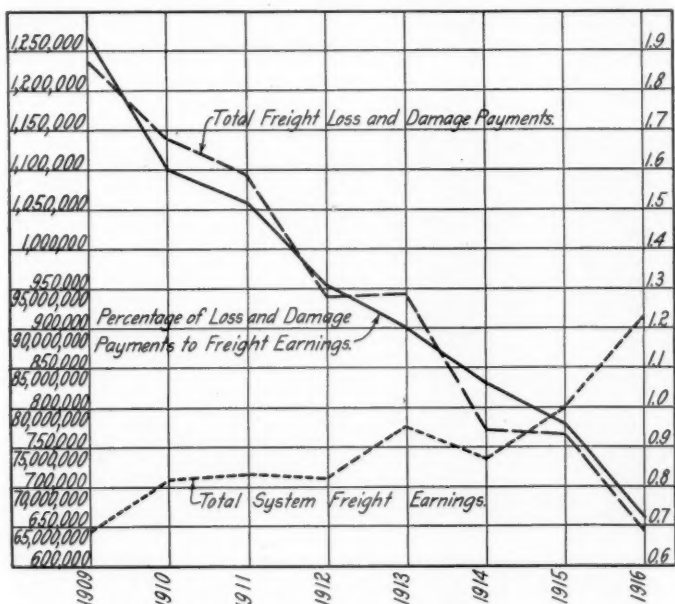
business; inadequate facilities, both terminals and rolling stock; increased hazards due to longer and heavier trains; the rapid deterioration of equipment, and the lack of co-operation on the part of shippers and connections in the work of prevention.

Freight claim payments had shown a steady and persistent growth year after year, the percentage of increase usually being in excess of the normal percentage of increase in freight revenue. In 1908 these payments reached the high total of \$1,565,434, or 2.53 per cent of the gross freight revenue of the company. This figure represented the high water mark of freight claim payments on the Santa Fe. However, it was no better or no worse than what other roads were paying in proportion to the amount of freight revenue earned. It was due to no extraordinary causes, but merely indicated the waste resulting from the hazards of transportation when no organized attempt was made to reduce these hazards to the lowest possible minimum.

Confronted with this large total and the indications of heavier future payments, the Santa Fe undertook to remedy conditions, and in 1909 made its first systematic study of the loss and damage problem. In September of that year a loss and damage committee was organized composed of representatives of every department of the road, whose duties were first, to locate the cause of the loss and damage, and second, to devise means of prevention.

Since its organization this committee has waged relentless warfare on loss and damage to freight, and its activities have gradually been extended to cover losses and damages of all kinds—personal injuries, loss and damage to baggage, damage to property and damage to stock on the right-of-way. As the prevention of loss and damage is the most important negative element in transportation efficiency and involves the discussion of practically every phase of railroad operation, the semi-annual meetings of the system loss and damage committee have come to be regarded as a sort of general system information meetings, where any question pertaining to the general efficiency of the road might be discussed, either formally or informally, among officials and employees.

How fruitful of results the work of this loss and damage committee has been may be judged from the following figures, showing the gross freight earnings, the payments for loss and



Freight Earnings, Loss and Damage Payments and Relations of Payments to Earnings

but the principal one was not always the attempts made to eliminate the real causes for loss and damage. These causes were numerous, but chief among them was the failure of officers and employees to take cognizance of the seriousness of the situation with the resultant lack of harmony and efficiency. Other contributing causes were the increase in

damage to freight and the percentage of freight claim payments to freight earnings for the past nine years:

Year	Gross Freight Earnings	Payments for Loss and Damage to Freight	Percentage of Freight Earnings
1908	\$61,848,638	\$1,565,434	2.53
1909	64,212,638	1,234,564	1.92
1910	71,194,055	1,141,014	1.60
1911	71,787,200	1,091,435	1.52
1912	71,529,574	939,676	1.31
1913	78,190,922	942,838	1.21
1914	73,638,388	772,300	1.05
1915	80,504,000	771,764	.96
1916	91,432,429	649,180	.71

Notwithstanding the great increase in gross freight earnings, the percentage of freight claim payments to freight revenue has shown a steady decline, while the total amount of claim payments has been reduced nearly two-thirds. For every dollar of freight revenue earned in 1908, the Santa Fe returned 2.58 cents to the shippers in payments for claims for loss and damage; last year the company returned but 0.71 cents, which is a remarkable showing in view of the great increase in freight business. The curves show graphically what this means.

The following table gives a comparison of the Santa Fe loss and damage payments and the ratio of claim payments to gross freight revenue with the claim payments of the other important roads operating in the same or similar territory for the year ending June 30, 1916:

	Freight Revenue	Freight Loss and Damage	Percentage of Freight Earnings
Santa Fe	\$91,432,429	\$649,180	.71
Foreign Line No. 1	32,287,854	302,223	.94
Foreign Line No. 2	48,370,000	556,134	1.15
Foreign Line No. 3	72,000,000	895,000	1.24
Foreign Line No. 4	60,353,399	864,988	1.40
Foreign Line No. 5	50,921,932	879,294	1.73
Foreign Line No. 6	21,697,723	347,406	1.60

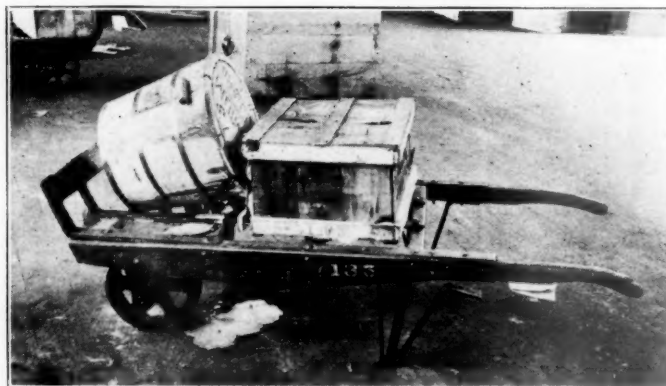
The following table shows the decrease in claim payments for 1916, as compared with 1915, classified in respect to the commodities shipped:

Commodity	1916	1915	Decrease
Agricultural implements	\$5,026	\$5,446	\$420
Boots and shoes	11,452	11,019	*433
Butter	984	946	*38
Candy	2,135	2,157	22
Castings	1,269	2,047	778
Canned goods	6,494	6,542	48
Clothing	14,287	19,527	5,240
Coal	5,816	5,672	*144
Cotton	2,715	4,268	1,553
Cotton seed and products	1,733	2,492	759
Crackers	721	886	165
Crockery	4,154	3,682	*472
Dairy products	1,077	1,504	427
Eggs	9,532	10,069	537
Dry goods, notions, etc.	11,979	14,535	2,556
Cigars	1,196	1,885	689
Flour	10,970	14,075	3,105
Wheat	32,319	59,611	27,292
Corn	4,915	10,236	5,321
Other grain	8,959	8,175	*784
Mill products	5,093	6,844	1,751
Dried fruit	7,395	5,529	*1,866
Furniture	30,481	33,528	3,047
Glass and glassware	11,599	11,909	310
Plate glass	3,781	2,181	*1,600
Hardware	8,618	7,213	*1,405
Stoves	8,034	8,852	818
Household goods, etc.	25,180	26,538	1,358
Fruit jars	916	405	*511
Lumber	4,700	5,957	1,257
Machinery	13,847	13,662	*185
Oils	16,794	19,040	2,246
Paper	3,151	3,919	768
Sewer pipe	4,006	3,297	*709
Potatoes	15,161	11,931	*3,230
Citrus fruit	56,927	60,067	3,140
Deciduous fruit	27,464	24,321	*3,143
Packing house products	6,337	13,001	6,664
Fresh meat	2,414	3,263	849
Vegetables	11,166	11,896	730
Other perishable freight	15,630	18,460	2,830
Sugar	14,594	9,499	*5,095
Tobacco	3,729	4,205	476
Vehicles	15,340	13,156	*2,184
Other dead freight unclassified	92,162	124,586	32,424
Wines and liquors	10,430	17,957	7,527
Live stock	103,861	118,411	14,550
Total	\$656,543	\$764,401	\$107,858
Balance in fund established March, 1915, for settlement of wheat claims		7,363	
Credit for above amount used in 1916		7,363 Cr.	
Grand total	\$649,180	\$771,764	\$122,584

* Increase.

That this showing is due to the work of the loss and damage committee cannot be denied in view of the persistent and uniform rate of decline. As shown in the curve, there has been no fluctuation. As the ratio of loss and damage payments to freight earnings is well below the one per cent mark, it is realized that the reduction must cease and may even show a slight increase owing to conditions over which the company has very little control, particularly in respect to interline shipments, but it is the ambition of the committee to keep the ratio below the one per cent line.

When the committee first began its investigations it was not difficult to determine the various causes of loss and



Leaky Lard Bucket Caused by Carelessness of a Trucker

damage to freight, but it was not so easy to arrive at conclusions as to remedies and the most effective methods of their application. Some of the evils were of long standing and were not chargeable directly to the carriers. It was soon realized, however, that in order to reduce the waste it was necessary to secure the co-operation of the employees in order to improve (1), the checking and forwarding of freight at forwarding points and transfer stations; (2), the handling of freight in transit in trains; (3), the checking and delivering of freight at destination; (4), the preparation of cars for the transportation of certain commodities such as bulk grain, flour, sugar and perishable freight. It was also apparent that



An Outbound House with Systematic Arrangement of Freight

the co-operation of the shippers must be secured in furnishing a better grade of package and improved methods of marking and packing shipments, which would insure the articles arriving at destinations in good condition if handled properly by the carriers. As the work of the committee advanced, it also was found necessary to obtain the co-operation of the other roads in the proper handling of interline traffic. This is the plan of action which has been followed persistently from the beginning with the results above indicated.

Through its system of reporting loss and damage to freight the cause of such loss or damage is located with comparative ease immediately when it is discovered. At the end of each year a tabulated form of these causes is rendered with the amount of money expended for claims arising from the various causes distributed to each. With this table it is no difficult matter to trace and remedy as far as possible the conditions which cause the loss or damage.

The following table shows the causes of the loss and damage on the Santa Fe for 1916, with the amount expended for each cause and the increase or decrease over the preceding year:

Causes	DAMAGE		Decrease
	1916	1915	
Wrecks	\$29,235	\$30,555	\$1,320
Delays	44,337	51,289	6,952
Defective equipment—leaky roofs, etc.....	25,470	32,521	7,051
Freezing	33,826	30,706	*3,120
Transferring carload freight.....	1,258	3,320	2,062
Unfit and unclean cars.....	10,203	7,360	*2,843
Fires in excess of insurance collected.....	4,229	7,688	3,459
Improper refrigeration and ventilation.....	10,642	13,304	2,662
Concealed damage	36,072	35,768	*304
Other causes except carelessness.....	292,257	329,989	37,732
Total damage	\$487,529	\$542,500	\$54,971



Lading Well Broken Down Preparatory to Sealing Car

Loss			
Loss of entire package.....	\$51,112	\$62,379	\$11,267
Loss from package.....	13,366	14,826	1,460
Loss from bulk shipment.....	41,804	71,786	29,982
Concealed loss	13,415	15,743	2,328
Theft	10,998	15,200	4,202
Other causes except carelessness.....	1,295	634	*661
Carelessness of employees.....	37,024	41,333	4,309
Total loss	\$169,014	\$221,901	\$52,887
Total loss and damage.....	\$656,543	\$764,401	\$107,858
Balance in fund established March, 1915, for settlement of wheat claims.....		7,363	.....
Credit for above amount used in 1916.....	7,363	.....	.....
Grand total	\$649,180	\$771,764	\$122,584

* Indicates increase.

To secure the co-operation of employees and accomplish the first four requisites in the campaign, it was necessary to make them realize the gravity of the situation and then remedy it. The efficiency of the work of handling freight must be increased. The necessary interest in the work was secured by a wide campaign of publicity among the employees. Posters, cartoons, bulletins and illustrated pamphlets showing all the phases of the loss and damage situation—the results of improper loading, packing, marking and stowing; the evils of carelessness, negligence and indifference, pointing out the remedy and appealing to the employees' sense of duty—were used.

The offices of transportation and switching inspector were created, whose duties are to supervise the loading and storing of freight, the handling of cars, switching movements,

etc., and to educate employees along these lines. Much also was accomplished through local conferences. Every general superintendent has a local loss and damage committee for his territory which meets every six months between the regular semi-annual meetings of the system committee for the consideration of loss and damage matters. In addition to this, attention was given the subject at the monthly division and information meetings, which are held at each division point and are attended by all division officers and by many employees whose duties will permit.

By these means the seriousness of the loss and damage situation was brought home to every employee and each individual was made to realize his own responsibility and the value of working harmoniously with his associates. Once his interest was aroused the task of applying the remedies recommended by the committee was made easy.

The co-operation of shippers has been secured in different ways—by correspondence, by personal solicitation and by agitating the subject in shippers' organizations. This co-operation consists in the main in the proper marking and packing of freight, and in the case of carloads, the proper loading, storing and bracing. Before approaching the shippers a study was made of ways and means of interesting them in the matter. It was realized that the best results could not be obtained altogether through criticism of shippers' methods of packing, loading and storing freight, but that the company must show a disposition to meet them half way. It was also realized that the economy in the material used by them in packing their products must be considered. So, when a shipper was approached with a complaint, it was done in a friendly way, but with convincing evidence of the incompetency in hand, showing wherein both he and his customer were suffering loss because of loose methods of shipping freight. This method usually brought about a speedy remedy.

The company also approached some shippers from a different angle. Letters of commendation were written to those deserving of such recognition for their effort to load freight properly and use competent containers. The results of this method of approach have been most gratifying, so much so, that the operating department has incorporated this mode of procedure as a part of the every-day work in cause and prevention. However, special precaution is always taken to avoid the possible error of commending an unsafe package, in the same manner care is taken to avoid criticism for frail or improper package unless it is warranted. The committee also has taken up with manufacturers of containers the questions of their merits and defects. By evincing a spirit of fairness and helpfulness towards them, these manufacturers have indicated a willingness to consider any criticism that might be offered from time to time.

Reduction of loss and damage on interline traffic can be secured only through the co-operation of other roads. The Santa Fe undertook to secure this co-operation, first, by learning of the methods adopted by foreign lines with a view of appropriating such as were beneficial; second, by investigating their attitude towards the loss and damage movement and the extent to which their work had progressed, and third, by influencing those that neglected loss and damage prevention to do their part. With these ends in view the loss and damage committee made a thorough canvass of 119 of the leading railroads. The following summary shows the extent of the work of loss and damage prevention on the roads canvassed:

Roads active in claim prevention.....	72
Roads semi-active	31
Roads non-active	16
Total	119

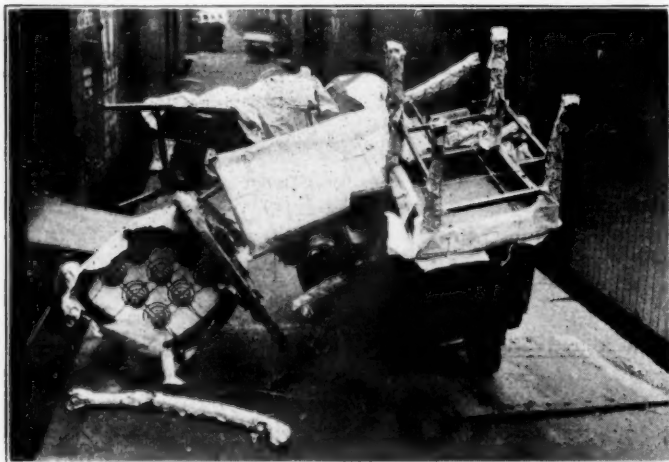
While the Santa Fe was the pioneer in this work, this canvass developed many important means of lessening claims for loss and damage which theretofore had not been used by the

company. The Santa Fe promptly put into operation such practices as were found advisable.

As long as a large percentage of claims are prorated with foreign lines, maximum results in claim prevention cannot be attained unless the other roads are equally interested and take the same or similar precautions to prevent loss and damage. The further the Santa Fe has gone into the work, the truer this statement has been found to be and the more it feels the need for real and active co-operation on the part of every carrier. A large percentage of the Santa Fe claim payments are now on interline shipments and it is realized that if the ratio of claim payments to freight earnings is to be further reduced or even maintained at the present figure, much of the work of prevention must be done by foreign lines.

Individual cases too often carry the idea that there is no complete harmony of ideas on the work of claim prevention and unfortunately some lines have not been convinced that the Santa Fe loss and damage movement has not been undertaken at the expense of connections. Texas lines in recent years have been burdened with excessive claim payments and the lack of harmony among themselves often retarded the efforts of any one line towards a betterment. However, it is the aim of the Santa Fe loss and damage committee to complete its canvass of every railroad in the United States of any consequence with a view to influencing greater activity on the part of railroads that are semi-active or inactive in this work to "do their part."

At present gratifying progress is being made. If a similar canvass had been made three or four years ago a much larger percentage of the roads would have been included in the non-active column and each year witnesses the roll of delinquents gradually lessening. To these roads the Santa Fe appeals directly or through the various railroad organizations, confronting them with the duty they owe their connections as well as themselves. Formation of claim conferences, particularly in Texas and on the Pacific Coast, also has brought about some satisfactory results. So far as the loss and damage of freight is concerned, it is the opinion of the majority



Furniture Damaged by a Defective Platform

that the time has come to join forces in a nation-wide movement to prevent it.

The details of the work of the general system loss and damage committee of the Santa Fe is done by various standing and special committees charged with special duties. The system committee meets twice a year with an attendance of from 150 to 200 delegates for the purpose of reviewing the work of the sub-committees, advising them and promoting a general interest in the subject. As indicative of the manner in which the work is done and the results accomplished, a brief summary of the activities of a few of the most

important sub-committees for the past year is given below:

Loading, Stowing and Bracing Freight—A book of rules governing the loading, stowing and bracing of freight has been prepared by the sub-committee for the guidance of men who have in charge the direct handling of freight. This rule book is made up of drawings, illustrations and text relative to the subject and will soon be promulgated. The rules and regulations are in line with the recommended practices of the American Railway Association.

To determine the most practical methods of loading, stowing and bracing the various commodities classified as L. C. L. freight, special investigations and tests were made. All incoming cars received at representative large distributing



Using Condemned Grain Doors to Protect Freight

points were inspected during a period of 30 days. Present practices of stowing and bracing different commodities were studied and proved effective, or improved upon by a series of progressive impact tests under actual switching conditions. The commodities selected for the test were those most liable to damage themselves or to inflict damage to adjacent lading if shifted or overturned. They included barbed wire, jacketed cans, pianos, radiators, range boilers, rolls of wire and cable, safes, sewing machines, sheet iron roofing and tombstones.

The tests were conducted by switching the cars at varying speeds and under conditions subjecting the loaded commodities to the most severe conditions possible, the impacts at the higher speeds representing practically wreck conditions. After each impact the braced commodity under test was examined and changes made to overcome the weak points in the bracing. Photographic records were made of the various methods of bracing employed both before and after impact. The speed of the cars at the time of impact was determined by a stop-watch, recording the time necessary for the cars to travel a measured distance.

Loading, Stowing and Bracing Furniture—Furniture is one of the most troublesome commodities dealt with by the claim department, claim payments showing a tendency to increase each year. For the six months period ending December 31, 1916, the increase in payments for loss and damage to furniture in carload lots over the preceding six months was 6.3 per cent, while the L. C. L. shipments increased 30 per cent. A very careful analysis of the largest distributing and shipping points on the system was made in an attempt to arrive at causes and remedies, and it was found that a great many shipments were arriving at destination properly stowed but were found to be in a damaged condition either before or after delivery, indicating the possibility of damage at the time received or loaded. To prevent this inspectors were placed at the principal shipping points whose duties

were to inspect as many shipments as possible before accepting. At one station 1,200 shipments were inspected during a two-months' period with the following results:

Loaded O. K., and checking same at destination.....	921
Loaded damaged, checking same at destination.....	97
Loaded O. K., checked damaged.....	16
Loaded damaged with additional damage at destination.....	11
Loaded O. K., transferred in transit O. K., but checked damaged at destination.....	7
Shipments tendered but which inspector found to be damaged and refused to accept without damage notation which shipper would not accept and shipments were returned for repairs.....	64
Total	1,116

It was found that some of the shipments that had been refused had been repacked in a different manner and ten-



Floor of a Local Freight House Showing Indiscriminate Piling of Freight

dered again the following day or later. One damaged shipment was tendered by a very large firm on three different occasions.

Besides the employment of inspectors other remedies have been put in force, including a very thorough investigation of every furniture O. S. & D. claim. The results of these investigations are made known to the sub-committee, particularly if anything new is developed. Employees also have been urged to eliminate rough handling of cars containing furniture; to prevent unnecessary handling in break-bulk cars by loading the L. C. L. shipments in station order whenever practicable and to make a more rigid inspection at receiving stations as to the proper loading, stowing and general handling.

Making and Breaking Trains at Terminals.—Much of the work of the sub-committee covering this subject is carried on by correspondence with a view of eliminating the switching of all through cars at division terminals. To effect this, stress is laid on the proper makeup of trains—placing cars for various destination in certain locations in the train. Transportation inspectors see that no unnecessary or rough switching is being done.

Loss of Entire Package.—This is the largest single item of loss which the company has to contend with, being 7.9 per cent of the total payments made during 1916. While a considerable reduction has been made in the total amount of payments covering this item during the past five years, its percentage to the total claims paid has remained practically stationary, as the following figures will indicate:

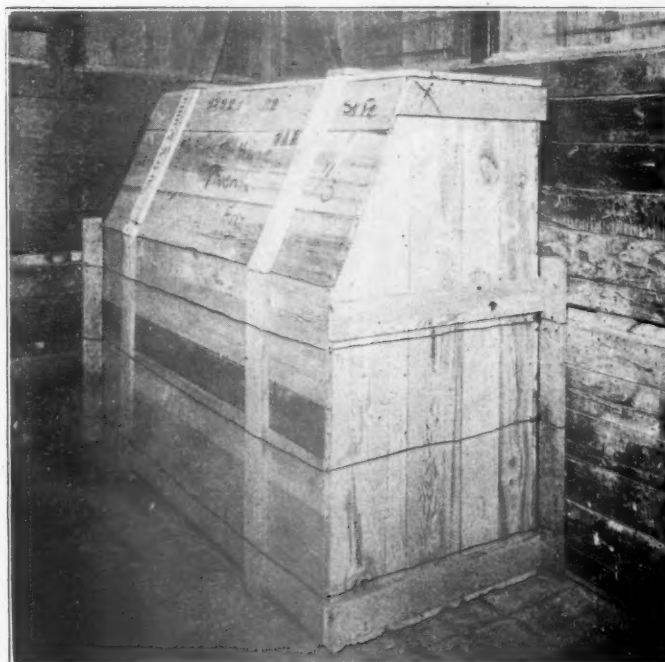
Year	Payments	Per Cent of Total
1912	\$72,792	7.7
1913	87,678	9.3
1914	69,054	8.9
1915	62,379	8.1
1916	51,112	7.9

It is the prevailing opinion that the loss of entire packages is not due to theft by employees but to laxity on the part of check clerks in receipting, the company failing to receive the shipment receipted for. Surprise tests have been conducted from time to time in an attempt to locate the responsibility for the loss, but only a negligible number of the

packages failed to reach their destination, which indicated that check clerks were giving receipts for packages that were not delivered. Lack of proper supervision after the freight is delivered also is a contributing factor. On account of the large amount involved due to the loss of entire packages the loss and damage committee has investigated this subject very closely and has made numerous recommendations of the most minute details of handling L. C. L. shipments. Constant vigilance on the part of employees is especially urged.

Eggs.—Seventy-five per cent of the damage to eggs occurs in carload lots and such breakage as occurs in transit is due to improper bracing and the consequent shifting of the packages. The committee has recommended the closest practicable supervision to insure the use of standard packages, fillers and packing and the proper loading, stowing and bracing of carload as well as L. C. L. shipments. Several approved plans of loading are in use at nearly all shipping points, and these have the hearty approval of shippers.

Cooperage.—The general practice of stripping side doors of cars loaded with flour and similar commodities has been discontinued on the Santa Fe and such precautions are taken only in case the doors are not rain tight. During the year ending June 30, 1916, claim payments on flour and other mill products averaged only 29 cents per car. Claim payments on grain were considerably higher, being 70 cents per car. As the carriers main reliance must be on the adequacy of its inspection of the equipment both as to the quality of the car and the cooperage material, a rigid inspection of cars used to haul grain is being maintained by the company. This not only includes ordinary inspection before loading, but various special inspections at certain specified points. Acknowledgment from the consignee of the condition of the



Bracing Pianos in Place with Cleats and Wire

car is required at the time of delivery. Efficiency tests for discrepancies, particularly in weights, are often conducted and such tests have proved of considerable benefit.

Live Stock.—Loss and damage to live stock is the largest commodity item of loss and damage incurred by the Santa Fe, being approximately 16 per cent of the total payments. In 1916 the percentage of claim payments to live stock revenue was 2.2 per cent. Although this ratio is much larger than the average ratio of claim payments to freight revenue, it compares very favorably with the records of other live stock

carriers, being bettered by only one other road. The following table shows the amounts expended by the company for loss and damage to live stock during the past seven years:

Year	Live Stock Payments	Year	Live Stock Payments
1910.....	\$277,964.06	1914.....	\$137,503.34
1911.....	244,852.73	1915.....	118,411.14
1912.....	190,006.14	1916.....	103,860.66
1913.....	169,662.44	1917.....	110,535.00

This is an unusual showing, especially when it is considered that the average claim payment per car in 1917 was \$0.46, while in 1910 it was \$2.93, and that the company handled nearly twice as many cars of live stock in 1917 as in 1910.

The heaviest items of loss and damage are chargeable to delay and unlocated damage, 50 per cent of the claim payments being chargeable to the latter. This is the result principally of inherent weaknesses causing the stock to die in transit. The Santa Fe handles more of the weak, emaciated cattle of the South and Southwest than any other road. Claim payments on this account can only be avoided by the maintenance of proper records at the time of shipment as to the physical condition and treatment to which the stock was subjected prior to loading. A very close inspection of equipment before loading also is necessary. In reducing claims on live stock the co-operation of employees is the most essential factor and the great reduction the company has made can be attributed largely to the fact that this co-operation has been secured. The Santa Fe incurs law suits only when such course is necessary to avoid payment of improper claims.

In addition to the above matters other subjects were investigated by the sub-committees of the loss and damage committee during the past year. Chief among them were the following:

- O. S. & D. reports.
- Modernized plans of freight house construction.
- Collection and distribution of data relative to loss and damage.
- Mechanical matters which have any relation to the proper handling of freight—defective equipment, inspection, repairs, the different types of cars, their use and abuse, their advantages and disadvantages.
- Handling of special commodities—explosives, newsprint paper, automobiles, cotton, etc. Transportation inspectors are required to specialize on certain commodities and submit their findings to the committee.
- Freight Claim Association rules and regulations.
- Pomerene bill of lading law.
- Numbering agricultural implements.
- Diversion failures.
- Necessity of through billing on interline shipments.
- Killing live stock on the right of way.
- Increased car loading.
- Baggage.
- Personal injuries and safety matters.

The broad scope of the system loss and damage committee is evident, but the work of investigation and applying remedies is done by sub-committees. It is carried on energetically to a conclusion and the system committee merely advises and passes on the work accomplished. The efficiency of this mode of procedure is responsible largely for the excellent results in reducing loss and damage claims on the Santa Fe.

LOCOMOTIVE INSPECTION RULES MODIFIED DURING WAR

The Interstate Commerce Commission on September 20 issued an order at the request of the carriers, making modifications, for the period of the war, in certain of the rules and instructions for the inspection and testing of steam locomotives and tenders. The order is as follows:

"Whereas, at a conference held in the office of the chief inspector of locomotives on September 5 and 6, 1917, to consider modifications of the rules and instructions for the inspection and testing of locomotives and tenders and their appurtenances, which were prepared jointly by the mechanical advisory sub-committee of the American Railway Association's Special Committee on Relation of Railway Operation to Legislation and the sub-committee on military equipment

standards, Special Committee on National Defense, American Railway Association, and proposed by the committee representing the carriers, on account of the present international crisis, certain modifications were agreed upon by the representatives of the carriers, the representatives of the employees and the chief inspector; therefore,

"It is ordered, That effective at once and to continue in force during the period of the war, except where otherwise specifically stated, rules 2, 10, 16, 23, 110, 112 (b), 128 (d), 142(c) and 150(a) shall be modified as follows, except where conditions are such that the safety of operation is adversely affected thereby:

Rule 2.—The lowest factor of safety for locomotive boilers which were in service or under construction prior to January 1, 1912, shall be 3.25.

"Effective six months after the close of the war the lowest factor of safety shall be 3.5.

"The dates on which factors of safety from 3.5 to 4, as provided in rule 2, become effective, shall be advanced for a period equivalent to the duration of the war.

Rule 10: Flues to be removed.—All flues of boilers in service, except as otherwise provided, shall be removed at least once every four years, and a thorough examination shall be made of the entire interior of the boiler. After flues are taken out the inside of the boiler must have the scale removed and be thoroughly cleaned. This period for the removal of flues may be extended upon application if an investigation shows that conditions warrant it.

Rule 16.—The date for removal of lagging for the purpose of inspecting the exterior of locomotive boilers as provided by rule 16, except where indication of leaks exist, shall be advanced for a period equivalent to the duration of the war.

Rule 23.—Method of testing flexible staybolts with caps.—All flexible staybolts having caps over the outer ends shall have the caps removed at least once every two years and also whenever the United States inspector or the railroad company's inspector considers the removal desirable in order to thoroughly inspect the staybolts.

"The firebox sheets should be examined carefully at least once a month to detect any bulging or indications of broken staybolts. Each time a hydrostatic test is applied the hammer test required by rules 21 and 22 shall be made while the boiler is under hydrostatic pressure not less than the allowed working pressure, and proper notation of such test made on form No. 3.

Rule 110.—Time of cleaning.—Distributing or control valves, reducing valves, triple valves, straight-air double-check valves, and dirt collectors shall be cleaned as often as conditions require to maintain them in a safe and suitable condition for service, but not less frequently than once each six months.

Add to Rule 112.—On E. T. or similar equipment where the brake cylinder pressure is maintained regardless of piston travel the maximum piston travel for driving wheel brakes shall be 8 in.

Rule 128 (d).—Locomotives in road service.—The total amount of side motion of rods on crank pins shall not exceed $\frac{1}{4}$ in.

Locomotives in yard service.—The total amount of side motion of rods on crank pins shall not exceed $\frac{5}{16}$ in.

Rule 142 (c).—Top leaf broken or leaves in top half or any three leaves in spring broken. (The long side of spring to be considered the top).

Rule 150(a).—The minimum height of flange for driving and trailing wheel tires, measured from tread, shall be 1 in. for locomotives used in road service, except that on locomotives where construction will not permit the full height of flange on all drivers the minimum height of flange on one pair of driving wheels may be $\frac{5}{8}$ in."

Factors in Locomotive Smoke Abatement*

How Smoke is Formed and How Brick Arches Reduce It; Ample Combustion Space and Flameway Needed

By J. T. Anthony

THE Master Mechanics' Association Proceedings for 1913 contain the report of the Smoke Committee appointed by the General Managers' Association of Chicago, which states that "while running, the brick arch is capable of making a 50 per cent reduction in smoke, irrespective of steam jets."

The tests upon which this statement was based were run with Penn gas coal of the following composition:

Fixed carbon	57.74	per cent
Volatile matter	34.07	per cent
Moisture	1.05	per cent
Ash	7.14	per cent
B.t.u. per pound of dry coal.....	14,520	

The smoke reduction of 50 per cent was accompanied by an increase in evaporation of 8.6 per cent, due to the arch.

The Chicago Smoke Commission, of which Dean Goss was chief engineer, made extensive tests with and without the arch. They found that the brick arch decreases the average density of visible smoke emissions 33 per cent; decreases the total average quantity of cinders and fuel dust emitted in smoke 25 per cent; decreases the amount of carbon contained in cinders and fuel dust per ton of coal consumed 24 per cent; decreases the amount of ash contained in cinders and fuel dust per ton of coal consumed 28 per cent; decreases the volume of air intermingled with gases of combustion discharged through the stack 15 per cent.; increases the volume of CO₂ discharged through the stack 6 per cent; decreases the volume of CO discharged through the stack 10 per cent, and increases the evaporation per pound of coal 7 per cent. These tests were run with coal from Macoupin County, Illinois, of the following composition:

Fixed carbon	37.47	per cent
Volatile matter	38.41	per cent
Moisture	9.89	per cent
Ash	12.23	per cent
B.t.u. per pound of dry coal.....	12,884	

Both of the above tests were run with an 0-6-0 type switching locomotive, with a narrow firebox 40 in. wide by 106 in. long, with 29 sq. ft. of grate area. The air inlet through the ashpan was 5.7 sq. ft., or 20 per cent of the grate area. The arch was 66 in. long and was supported on two arch tubes.

The final conclusions of the above test report also stat that "the presence of the brick arch in the locomotive firebox increases efficiency and decreases fuel consumption, decreases the loss of heat units in smoke and ash discharged and reduces the visible smoke.

"The use of incorrect methods of firing, as indicated by the results of tests in which inexperienced firemen were employed, reduces efficiency, increases fuel consumption and fuel losses and increases smoke discharges."

Tests recently conducted on a Mikado type locomotive show smoke reductions varying from 50 per cent at low and medium rates of firing to 31 per cent at high rates, as shown by the curves in Fig. 1. The locomotive was hand-fired using high volatile Penn gas coal screened over a 1¼-in. mesh screen, the coal having the following composition:

Fixed carbon	54.00	per cent
Volatile matter	31.00	per cent
Moisture .....	.92	per cent
Ash	14.08	per cent
B.t.u. per pound of dry coal.....	13,088	

This locomotive had 70 sq. ft. of grate area, a barrel combustion chamber 42 in. long, a 76-in. arch supported on

four 3-in. arch tubes, an air opening through the ashpan of 7.80 sq. ft.—11 per cent of the grate area—and air openings in the grate of 20.21 sq. ft.—28.8 per cent of the grate area,

In these tests the increase in evaporation, due to the arch, varied from 8½ per cent to 15½ per cent. These three tests are probably the most thorough and reliable that have ever been conducted for the specific purpose of determining the effect of a brick arch on locomotive smoke abatement, and the test results are corroborated by the practical experience of railroad men throughout the country. The principal measures taken by railroads today to meet smoke ordinances consist of issuing firing instructions and equipping locomotives with brick arches.

While it is generally recognized that the brick arch will reduce the smoke emission from a locomotive, the reason therefor may not be clear. The formation of smoke is due primarily to the decomposition of the volatile hydrocarbons contained in all bituminous, semi-bituminous and lignite coals, though the presence of coal dust that is fed into the firebox and whirled out through the tubes unburned, adds to the smoke emissions.

As the name indicates, the volatile hydrocarbons are com-

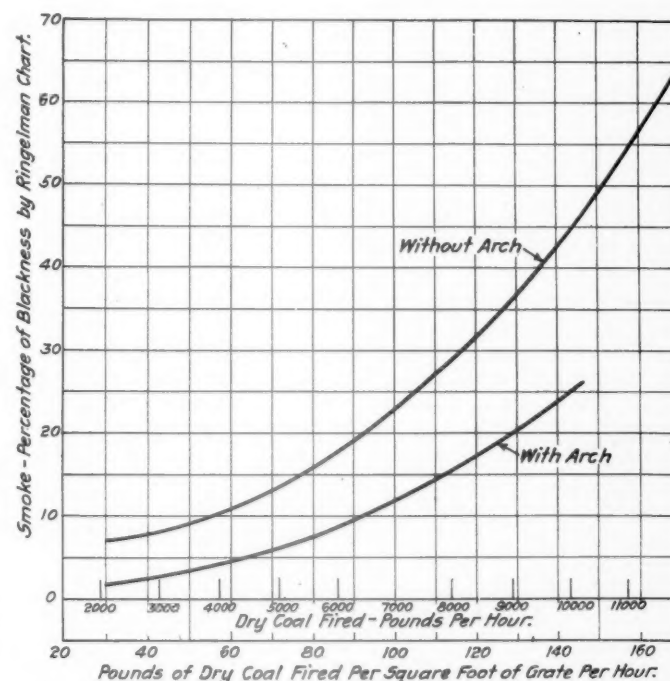


Fig. 1—The Effect of the Brick Arch on Smoke Reduction

pounds of carbon and hydrogen, and are of a very complex character. The heavier compounds are driven off in the form of tar in a semi-liquid or solid state, while the lighter hydrocarbons are driven off in a gaseous state. The distillation begins at a temperature around 400 deg. F., and is completed at a temperature of 1,600 deg. F. The decomposition of the volatile matter by the action of heat takes place very readily at temperatures above 1,400 deg. F.

The exact composition of the hydrocarbons when first distilled from the coal at the different temperatures is not known, as they break down so readily under the influence

*From a paper read before the annual convention of the Smoke Prevention Association.

of heat and are so unstable that it is impossible to collect samples for analysis. The indications are, however, that the heavy hydrocarbons when first driven off contain by weight about 85 per cent carbon, 10 per cent hydrogen and 5 per cent oxygen. Under the influence of heat, these hydrocarbons break down into carbon, hydrogen, oxygen, lighter hydrocarbons of the methane (CH_4) series, and lighter unsaturated hydrocarbons.

The hydrogen is highly inflammable and burns readily if there is an oxygen supply above the fuel bed. The lighter hydrocarbons also burn readily if the oxygen supply is sufficient. If it is insufficient the hydrocarbon is broken down by the heat into carbon and hydrogen, the hydrogen either combining with the oxygen that may be present to form water or escaping into the tubes unburned.

Carbon does not exist in a gaseous state at temperatures with which we are familiar in furnace practice. When the various hydrocarbons are decomposed, the carbon is precipitated as a solid particle in the form of soot and these incandescent particles, floating in the flame, give it the luminous color. We are apt to think of this carbon as being set free and deposited in the form of atoms, but such is not the case. We have no knowledge of the atom existing as a unit, separate and distinct. The small particles of soot with which we have to deal are probably made up of a large number of carbon molecules. The very smallest soot particle that exists is this molecule, which consists of a number of carbon atoms (probably 12), held together by a sort of bond or attractive force of an electrical nature.

As a result the soot particles, which are the primary source of all smoke, have a very tenacious structure and are extremely difficult to break down when once formed. In order to burn them completely, it is necessary to supply a number of oxygen molecules sufficient to combine with each carbon atom, to bring them into contact with the carbon atoms at a temperature high enough to sustain combustion and to provide time sufficient for the combustion to be completed.

These conditions are similar to those met with in burning the "fixed carbon" on the grate, but are more difficult to fulfil. A piece of coke, or carbon, burning on the grate is held more or less in place until it is consumed. Combustion is accelerated by the high temperature prevailing in the fuel bed and by the violent scrubbing action of the oxygen in the air rushing through the fuel bed.

The particle of soot resulting from the breaking down of the hydrocarbons is well on its way to the tubes at the instant of its formation. It is not brought into violent mechanical contact with a supply of oxygen, but floats along in an atmosphere that has been robbed of much of its oxygen in passing through the fuel bed. The temperatures prevailing in the upper part of the firebox are generally sufficiently high to insure ignition and combustion, but under ordinary conditions the time available for combustion varies from $\frac{1}{5}$ to $\frac{1}{10}$ of a second, and this is insufficient.

With the conditions that prevail in the locomotive firebox, it is easier to prevent the formation of soot than to burn it when once formed. The precipitation of soot can be prevented only by having an excess of heated air (or oxygen) above the fuel bed, and bringing this heated oxygen in intimate contact with the volatile hydrocarbons at the instant they are distilled off. Research work done by the United States Bureau of Mines indicates that the hydrocarbons are decomposed when they have travelled but a few inches from the top of the fuel bed, and if the precipitation of carbon is to be prevented the air must be introduced at the top of the fuel bed and intimately mixed with the issuing hydrocarbons.

The chief function of the brick arch in abating smoke is that of a gas mixer. By baffling and compelling all of the gases to pass through a relatively restricted area above the arch an intimate mixture of the volatile combustible with the

oxygen is insured. While the mixing of the gases at the end of the arch does not take place soon enough to eliminate smoke entirely, it has the effect of reducing the smoke emissions, as shown by the tests quoted.

In a firebox without an arch carrying a characteristic fire,—that is, with a bank of green coal under the fire door, the fire gradually becoming thinner toward the front end of the grate, where the draft has possibly pulled a hole in it,—the bank of green coal under the door is expelling large volumes of rich hydrocarbons. These, passing up along the top zone of the firebox, are decomposed by the heat, causing the formation of soot which either escapes at the front end as smoke or is deposited on the heating surfaces to retard the flow of heat.

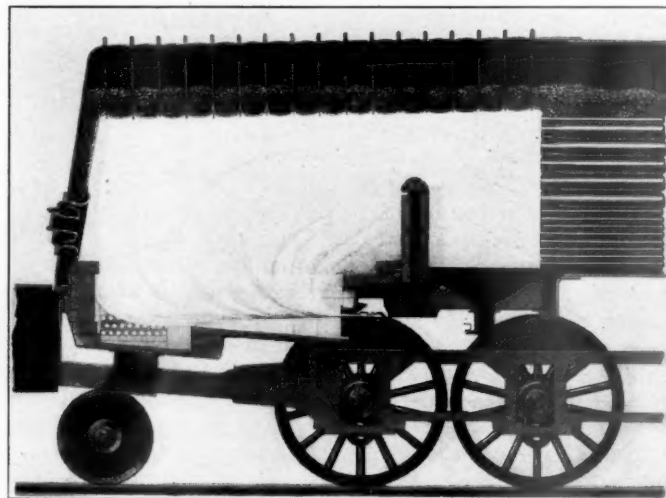


Fig. 2—Type of Combustion Chamber in Successful Use in Oil Burning Service

At the same time a large excess of air is rushing through the thin portion of the fire on the front of the grate, and is passing directly into the lower tubes without in any way aiding the combustion of the hydrocarbons liberated in the back of the box and very often causing flue leaks or failures. Such conditions are not at all uncommon in locomotive fireboxes unequipped with the arch. Front end gas analyses often show a large excess of oxygen, due to the blast of air through the lower tubes, in combination with high carbon monoxide, hydrogen and hydrocarbon contents due to incomplete combustion of the volatile hydrocarbons arising from the bank under the door.

With the arch under similar conditions any excess air coming through the thin portion of the fire on the front of the grates is heated up, deflected and forced back over the end of the arch, where it is mixed with the gaseous combustibles arising from the green coal under the door. A heavy bank of green coal restricts the flow of air at the point where it is most needed and at the time when it is most needed,—with the result that most of the hydrocarbons are broken down and the carbon precipitated before being brought into contact with the oxygen entering through the front grates. With the ordinary type of firebox the combustion chamber space and the flameway are insufficient to give all the particles of soot and combustible gas time to burn before reaching the tube sheet, but such a mixing as the arch affords results in a material reduction of the smoke, and under moderate rates of firing will result in almost complete combustion of the combustible gases.

A light level fire should be carried, if smoke is to be reduced to the minimum. With the fuel bed maintained in this condition by a "scatter" type of firing, a uniform air supply is obtained throughout the fuel bed as well as a uniform distillation of the hydrocarbons. This facilitates the mixture of the oxygen and the hydrocarbons from the time

they leave the top of the fuel bed, the arch mechanically accelerating this mixture.

Some authorities state that the decomposition of the hydrocarbons is caused by heating them up with an insufficient air supply and then bringing them in contact with the cooler heating surfaces or a draft of cold air. While later evidence tends to prove that this decomposition is caused entirely by heat, shafts of cold air through the firebox are objection-

gases in the combustion space provided above the fuel bed.

For a specific example, take the second case shown in Table I, where $47\frac{1}{2}$ lb. of coal are burned per sq. ft. of grate per hour, with the fuel bed six inches thick.

Table II shows in lb. per cu. ft. of gas the weights of the different gases leaving the fuel bed, the heat value per pound and B. t. u. per cu. ft. of gas. The gas has a total heat value of 156.6 B. t. u. per cu. ft., of which 70.7 B. t. u., or 45

TABLE I—GAS SAMPLES TAKEN AT THE TOP OF THE FUEL BED

Lb. coal fired per sq. ft. of grate per hour	Thickness of fuel bed	Wt. in grams per cu. ft. of total gases at 60 deg. F. and 30 in. mercury									Soot and tar, per cent of total combustible
		C in CO	CH ₄	H ₂	C ₂ H ₄	Total gaseous combustible	Tar	Soot	Total soot and tar	Total combustible	
22.3	6	2.034	.628	.209	.732	3.603	.528	.482	1.010	4.613	21.9
47.5	6	2.136	.142	.068	.036	2.382	.241	.369	.610	2.992	20.4
63.4	6	1.466	.215	.072	.107	1.860	.107	.215	.322	2.182	14.7
124.0	6	1.488	.018	.014	.326	1.846	.004	.016	.020	1.866	1.1
52.0	12	2.536	.484	.173	.242	3.435	.945	.477	1.422	4.857	29.3
105.5	12	2.522	.516	.241	.344	3.623	.658	.738	1.396	5.019	27.8
131.0	12	2.389	.036	.036	.036	2.497	.055	.092	.147	2.644	5.6
185.0	12	1.634	.108	.072	.036	1.850	.123	.415	.538	2.388	22.6

able—both from the standpoint of combustion and of boiler maintenance.

It is evident from the foregoing that the arch is not in itself sufficient to prevent smoke. Intelligent firing is also necessary. Smokeless firing and intelligent firing are almost synonymous, although there are conditions under which smokeless firing is impossible, regardless of the care and intelligence exercised by the fireman.

In some quarters there has been prevalent an idea that smoke was mainly a nuisance, and that the emission of dark clouds of smoke did not signify any appreciable heat loss. As a matter of fact the emission of smoke not only indicates bad furnace conditions, but in many cases the soot and tar escaping as smoke may contain from 10 to 15 per cent of the heat value of the coal, and this will account for a considerable portion of our "unaccounted-for" heat losses.

Tests conducted by the United States Bureau of Mines (see Technical Paper 137) showed that when burning Penn gas coal as high as 32 per cent of the combustible arising

per cent, are developed in the fuel bed and 85.9 B. t. u., or 55 per cent of the total heat contained in the coal, are developed by the burning of the combustible gases above the fuel bed.

TABLE II—HEAT DEVELOPED IN FUEL BED, AND POTENTIAL HEAT IN GASES, SOOT AND TAR

Heat Developed in the Fuel Bed				
Constituent	Wt. grams per cu. ft.	Wt. lb. per cu. ft.	Heat value per lb.	B.t.u. per cu. ft. gas
C in CO	2.136	.00471	4,500	21.2
C in CO ₂	1.546	.00341	14,500	49.5
Total				70.7
Potential Heat in Gases, Soot and Tar				
C in CO	2.136	.00471	10,000	47.1
CH ₄	.142	.000313	24,000	7.5
H ₂	.068	.000149	62,000	9.3
C ₂ H ₄	.036	.000079	21,600	1.7
Soot	.369	.000813	14,500	11.8
Tar	.241	.000531	16,000	8.5
Total				85.9

The tar and soot shown in the foregoing table contain 12 per cent of the heat in the coal. If one-half of this were to escape unburned as smoke the resulting heat loss would be six per cent; and such losses are constantly occurring.

The amount of heat developed by the gases burning above the fuel bed will serve to illustrate the importance of firebox volume and combustion chamber space, and will also explain why intelligent firing with the use of a brick arch is not always sufficient to prevent smoke. The ordinary firebox in service to-day has not volume and combustion chamber space sufficient to provide the time element that is essential for the complete combustion of volatile hydrocarbons and the total elimination of smoke. This deficiency has been recognized by some of our railroads and during the past few years many fireboxes have been provided with combustion chambers, particularly in locomotives of the 2-10-2 and Mallet types, but combustion-chamber engines are few, when compared with the total number of locomotives in service.

It is also probable that we have been too conservative as to the length of combustion chambers that have been installed. Tests indicate that an 18-ft. or 19-ft. tube is sufficient to reduce the front end temperatures to a normal figure. Tubes of this length, when used in conjunction with a firebox of ample grate area and long combustion chamber, result in a boiler design that gives both high efficiency and high capacity.

Fig. 2 shows a type of combustion chamber that is being used successfully in oil-burning service on some 2-10-2 type locomotives. This firebox has a combustion chamber $41\frac{1}{2}$ in. in length between tube sheet and bridge wall, firebox volume of 435 cu. ft., and an average flame path of 19 ft.

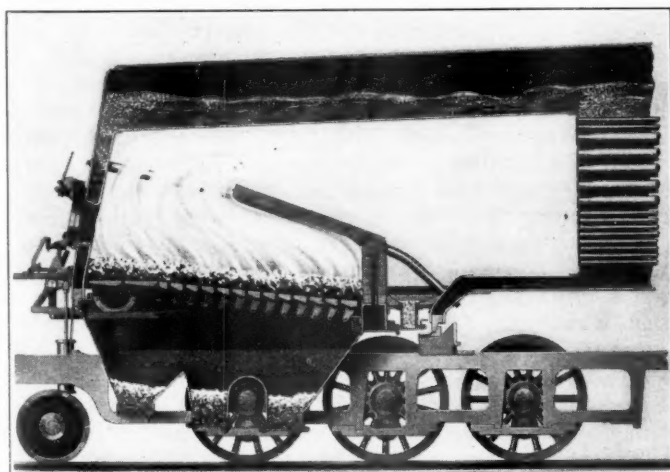


Fig. 3—Gaines Furnace Combined with Barrel Combustion Chamber

from the fuel bed is accounted for in the soot and tar which is the source of smoke.

Table I, which is taken from the bulletin mentioned above, shows the composition of gases arising from the fuel bed and the percentage of the soot and tar therein contained. It is evident from these figures that the fuel bed acts chiefly as a gas producer, and a large part of the latent heat contained in the coal is liberated by the burning of combustible

With a fuel oil containing 85 per cent carbon, nine per cent hydrogen and six per cent oxygen, weighing 7.43 lb. per gallon, having a heat value of 18,878 B. t. u. per pound, it was found that one square inch of air opening in the pan per gallon of oil burned per hour was sufficient to obtain complete and smokeless combustion, even when burning 4,000 lb. of oil per hour. At this rate of combustion, an indicated boiler efficiency of 85 per cent was obtained with the Gaines wall in place. With the wall removed the boiler efficiency was 74 per cent, or a difference of $13\frac{1}{2}$ per cent in favor of the wall. With the wall removed, at a rate of combustion of 4,000 lb. of oil per hour, there was a very noticeable increase in the amount of smoke emitted. This serves to show the need of a baffle or some sort of mechanical mixing device that will insure the thorough mixture of the air with the combustible gases.

For coal-burning service, a modification of the above design is being used most successfully on several railroads. This combination of the bridge wall with air ducts through the wall admitting a secondary air supply above the fire is known as the Gaines Locomotive Furnace. Here an attempt has been made to increase the firebox volume and flameway by reducing the tube length and installing a combustion chamber between the bridge wall and the tube sheet. This firebox has obtained some of the results desired, but for high volatile coal burned at high rates of combustion the combustion chamber space is too limited.

Fig. 3 shows a Gaines furnace in combination with a barrel combustion chamber. Here additional firebox volume and flameway have been obtained by materially increasing the length of the combustion chamber and, as this particular

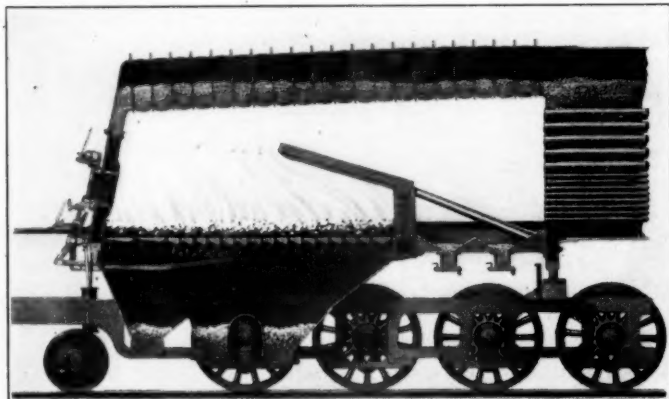


Fig. 4—Gaines Furnace with an Effective Volume of More Than 500 Cu. Ft.

design was used on Mallet engines, this result was obtained without unduly shortening the tubes.

Fig. 4 shows a Gaines furnace installation in the same size firebox, with the barrel combustion chamber eliminated. This firebox has a grate area of 90 sq. ft. and more than 400 sq. ft. of firebox heating surface, with an effective volume of more than 500 cu. ft. The average length of flameway or gas passage is 15 ft. and the over-all length of the firebox is 18 ft. $3\frac{1}{2}$ in. This represents the latest endeavor to secure adequate firebox volume and flameway.

While the results obtained from this type of furnace have proved most satisfactory, there is still room for improvement in the matter of smokeless combustion. The scientific training of firemen, the use of brick arches and the installation of combustion chambers have all tended to reduce the visible emission of smoke, but the burning of high volatile coal at high rates of combustion with the total elimination of smoke has not yet been successfully accomplished; and the indications are that some radical changes in locomotive firebox design and methods of firing coal will be necessary for the accomplishment of this object.

WASHINGTON CORRESPONDENCE

WASHINGTON, D. C., September 25, 1917.

MORE RAILWAY REGIMENTS FOR FOREIGN SERVICE

Additional railway and engineer regiments, in addition to the nine regiments of railroad men organized earlier in the year and who are now understood to be in service abroad, have recently been authorized by the President and the war department and are now being recruited by the engineer corps of the army.

In General Order No. 108, just made public by the war department, the President directs that there be organized for the period of the existing emergency, the enlisted strength being raised and maintained by voluntary enlistment or draft, special and technical engineer troops, including six regiments, and additional smaller units of engineers for each army and 14 regiments for the line of communications, the organization of the latter being under the direction of S. M. Felton, director general of railways.

The authorization for the line of communications, which includes the nine railway regiments already organized, but also provides for an increase in the number of men in each company, from 180 to 250, is as follows:

1. A general construction service, consisting of the following: 1 regimental headquarters, 6 engineer companies (construction), 6 service battalions (4 companies each).

2. An engineer supply service, consisting of the following: 1 regimental headquarters, 2 battalions of engineers (supply) of 3 companies each, 2 battalions of engineers (workshop) of 3 companies each, 3 service battalions (4 companies each).

3. A forestry service, consisting of the following: 1 regimental headquarters, 10 battalions of engineers (forestry) of 3 companies each, 9 service battalions (4 companies each).

4. A quarry service, consisting of the following: 1 regimental headquarters, 2 battalions of engineers (quarry) of 3 companies each, 3 service battalions (4 companies each).

5. A light-railway service, consisting of the following: Construction department, 1 regimental headquarters, 5 battalions of engineers (railway) of 3 companies each, 3 service battalions (4 companies each); operation and mechanical department, 1 regimental headquarters, 4 battalions of engineers (railway) of 3 companies each, 3 service battalions (4 companies each).

6. A standard-gage railway service, consisting of the following: Construction departments, 5 regiments of engineers (railway) (the 11th, 15th, 16th, 17th and 18th engineers, railway, National Army), 8 service battalions (4 companies each); operation and maintenance department, 2 regimental headquarters, 6 battalions of engineers (railway) of 3 companies each, 3 service battalions (4 companies each); mechanical and supplies department, 1 regiment of engineers (shop) (19th engineers, railway, National Army), 1 battalion of engineers (railway) of 3 companies, 1 service battalion (4 companies).

Of these the regiments for the general construction service, the engineer supply service, the forestry service, and the light railway service are new. The 9 regiments already organized are the 11th to the 19th, inclusive. The 20th engineers (forestry) is being formed at American University, Washington, D. C. The 21st engineers, for construction of light railways, is being organized at Camp Grant, Rockford, Ill., under Col. Edward Peak, with H. J. Slifer, consulting engineer and formerly general manager of the Chicago Great Western, as lieutenant colonel.

The engineering organization for each army, in addition to that for the line of communications, will consist of a gas and flame service, a mining service, a water supply service, a general construction service, an engineer supply service, a surveying and printing service, a road service and an army pontoon park.

Service battalions will be transferred from one service to another as may be necessary. Engineer troops of a special service may be utilized in another engineer service in the discretion of the commanding general concerned.

A regimental headquarters will consist of: Commissioned, colonel, 1; lieutenant colonel, 1; captains, 3; total, 5, and enlisted, 38. A battalion of engineers will consist of: Battalion headquarters, commissioned, major, 1; captains, 2; first lieutenant, 1; total, 4, and enlisted, 24. An engineer company will consist of: Commissioned, captain, 1; first lieutenants, 3; second lieutenants, 2; total, 6, and enlisted, 250. An army pontoon park (material, 3 pontoon divisions and 1 supply division, complete) will consist of: Commissioned, first lieutenant, 1; second lieutenant, 1; total, 2, and enlisted, 181. A service battalion will consist of: Battalion headquarters: Commissioned, major, 1; first lieutenant, 1; second lieutenant, 1; total, 3, and enlisted, 6. Four service companies, each of the following personnel: Commissioned, captain, 1; first lieutenant, 1; second lieutenant, 1; total, 3, and enlisted, 250. Wagon companies and truck companies will also be organized of engineer personnel.

The general order also provides for medical assignments for each unit. Other provisions of the order are as follows:

Technical equipment and additional transportation therefor will be supplied by the engineer department.

Railway operating and shop troops, forestry troops, and service battalions will be equipped as infantry, but only 10 per cent will be armed, except during training, when all will be armed; noncommissioned officers of these organizations will be armed with pistols. All other special engineer troops will be armed as divisional engineer troops.

Under authority conferred by the first sentence of section 2 of the act of Congress approved May 18, 1917, enlisted men of the corps of engineers and members of the engineer enlisted reserve corps, selected for these organizations by the chief of engineers, will be transferred thereto under authority of this order. Notation of transfer, and in the case of non-commissioned officers of continuance of warrant, will be made on the individual records of all enlisted men transferred. This authority will not be construed to authorize any enlistments in the enlisted reserve corps in excess of those already authorized. The National Army cantonments will be utilized for the organization of the units herein authorized. The cantonment at which each unit is to be organized will be determined by the chief of engineers after consultation with the quartermaster general. When necessary for special engineer training, these organizations may be sent to one of the regular engineer training camps.

The selection of officers for these regiments is under the direction of Mr. Felton, Capt. E. N. Sanctuary of his staff being in charge of matters of personnel. Railway men who have been drawn under the terms of the selective service act may be transferred to the engineer regiments.

STEEL PRICES REDUCED

Reduction in the basic prices of iron, steel, ore and coke, ranging from 43 to 70 per cent, as a result of a more or less voluntary agreement of the steel producers with the War Industries Board and based on cost of production figures, as ascertained by the Federal Trade Commission, were announced with the approval of the President on Monday. The prices, which will apply alike to purchases by the government, the Allies and the public, which includes the railroads as large users of steel, becoming effective immediately, subject to revision on January 1, 1918, are as follows:

Commodity and Basis	Price agreed upon	Per cent of reduction
Iron ore, lower lake ports.....	*\$5.05	....
Coke, Connellsville	† 6.00	....
Pig iron	*\$33.00	43.1
Steel bars, Pittsburgh, Chicago.....	‡ 2.90	47.3
Shapes, Pittsburgh, Chicago.....	‡ 3.00	50.00
Plates, Pittsburgh, Chicago.....	‡ 3.25	70.5

* Gross tons. † Net ton. ‡ Hundredweight.

It is understood that these prices will not affect existing contracts, but that they will probably be of more immediate benefit to the railroads than the coal prices recently fixed, which applied only to the 20 to 25 per cent of the supply uncontracted for and which in many cases were higher than the prices named in long term contracts of large consumers.

The agreement stipulated that there should be no reduction in wages and the steel men pledged themselves to exert every effort to keep production up to the maximum.

One of the big problems encountered was similar to that so often discussed in consideration of railroad rates, involving the question of how to fix prices that would enable the smaller mills to produce without loss while preventing the larger plants from making too great a profit. It was settled by a plan which there has been great reluctance to apply to the railroad situation, of attempting to allow a fair price to the smaller producers, even if it does allow the larger producers a greater profit, but this decision was facilitated from the government standpoint by the fact that a large part of the profits may be taken by taxation.

Measures will be taken by the War Industries Board for placing orders and supervising the output of the steel mills in such a manner as to facilitate and expedite the requirements for war purposes and to supply the needs of the public in the best interests of all.

Coincident with the announcement of steel prices, the priorities committee of the War Industries Board made public its first general priority circular, giving instructions as to priority in orders and work for all individuals, firms, associations and corporations engaged in the production of iron and steel, and in the manufacture of their products. The committee is composed of Judge Robert S. Lovett, chairman, Major General J. B. Ayleshire, George Armsby, Rear Admiral M. E. Mason, Edwin B. Parker, J. Leonard Replogle and Rear Admiral A. V. Zane.

Under the regulations all orders and work are divided into three classes. Class A comprises war work, i. e., orders and work urgently necessary in carrying on the war. Class B comprises orders and work which, while not primarily designed for the prosecution of the war, yet are of public interest and essential to the national welfare, or otherwise of exceptional importance. Class C embraces all other orders and work. All orders will be classed as Class C unless covered by certificates to be issued by the committee. Orders and work in the other classes will have precedence and classes A and B will in turn be separated into subdivisions composed of orders regarded respectively as of greater moment and to be given precedence in accordance with serial number. Certificates will be issued upon application specifying the classification of the order or work. Certificates of a subsidiary nature will be issued upon request for the furnishing of material and articles required in manufacturing the article or prosecuting the work ordered. War orders of the Allies, as well as of the United States, will be placed in Class A in the case of those already contracted for. Orders previously placed by the War and Navy departments or the Shipping Board will be classed as subdivision A-1 of Class A unless otherwise ordered. Orders already placed by the Allies for war materials will be classed as subdivision A-2 of Class A unless otherwise ordered.

JUDGE ADAMSON TO LEAVE CONGRESS

William C. Adamson, of Georgia, who is chairman of the House Committee on Interstate and Foreign Commerce, who has had a potent influence on railroad legislation in Congress for several years, and who is chairman of the committee that has its name attached to some of the most important railroad laws that have been recently passed, including the eight-hour law for train service employees, has been appointed general appraiser of merchandise at the port of New York and is

to leave Congress shortly, after 20 years of service in that body. His successor as chairman on the Committee on Interstate and Foreign Commerce has not yet been announced, but the next ranking member is Representative Thetus W. Sims, of Tennessee. Judge Adamson's name had also been on the long list of candidates urged upon President Wilson for appointment to the Interstate Commerce Commission.

RAILWAY WAGES AND TAXES INCREASE, RATES DECLINE

The railways of the United States in the calendar year 1916 paid a higher average wage per employee, a greater amount per mile in taxes and handled freight at a lower rate per ton per mile than at any period in their history. These facts are disclosed by a compilation made by the Bureau of Railway Economics of the returns made to the Interstate Commerce Commission by the so-called Class I roads—those having annual operating revenues exceeding \$1,000,000. These returns for the first time are for the year ending on December 31, according to an order of the Commission making the fiscal year coincide with the calendar year, and they cover railways having 89 per cent of the mileage of the country and receiving 97 per cent of the total operating revenues.

Compared with a similar compilation of returns for the year ended on June 30, 1916, the average wage per employee of these roads shows an increase from \$840.62 to \$868.69, or \$28.07. This is exclusive of salaries to general and division officers.

In the same period taxes increased from \$631.29 per mile to \$680.63 per mile, or \$49.34; and the average freight rate per ton mile decreased from 7.07 mills in the year ended on June 30, 1916, to 7.06 mills in the year ended on December 31, 1916. Passenger rates increased slightly as between the two periods—from 1.995 cents in the year ended on June 30, to 2.042 in the year ended on December 31.

The mileage included in the two compilations is substantially the same, being 231,246 miles in the statement for the former fiscal year and 231,179 in the statement covering the new fiscal year.

The increase in the volume of service performed in the two periods under comparison was from 339,883,000,000 to 362,134,000,000, or 22,251,000,000 ton miles of revenue freight, and from 33,783,000,000 to 34,573,000,000 or 790,000,000 passenger miles.

The average number of employees of these roads, exclusive of general and division officers, increased from 1,563,928 to 1,626,103, or by 62,175; and their aggregate compensation increased from \$1,314,665,664 to \$1,412,579,190, or \$97,913,526. The increase in number of employees was 4 per cent and in their compensation 7.4 per cent.

Total operating revenues increased from \$3,381,945,764 to \$3,592,591,023, or \$210,645,259, equal to 6.2 per cent. Operating expenses increased from \$2,211,071,443 to \$2,354,548,724, or \$143,477,281, equal to 6.4 per cent. Taxes increased from \$145,536,535 to \$156,875,396, or 7.7 per cent.

Investment in road and equipment showed an increase for the year ended on December 31 as compared with the year ended on June 30, of \$198,658,088.

RED CROSS TRANSPORTATION SERVICE.—Major Murphy, head of the Red Cross Commission in France, has sent a cablegram to America asking for expert motor-truck drivers without delay. Owing to the congestion of the railroads in France, large quantities of Red Cross supplies are being transported by motor truck from seaports to Paris and other distribution centers.

AMERICAN RAILWAY REGIMENT NOW OPERATING MILITARY RAILROAD

"By day and by night the men of the American regiment of engineers which has taken over an important line of French strategic railways are hauling tons upon tons of ammunition and other supplies to the French army units operating against the Germans.

"The American regiment," continues an Associated Press despatch, "has been turned over as a unit to the French and is getting all its supplies except clothing from the French government. The officers and men entered upon the work with the greatest enthusiasm, and they have been under German bomb and machine-gun fire from airplanes.

"Within the last few nights a heavy train of supplies hurrying toward the front was attacked by several enemy planes. None of the bombs came dangerously close, but every time the fire-box of the engine was opened for stoking the planes swooped down upon the train and spattered it with steel-jacketed bullets.

"This fire got so hot that eventually the train was stopped, the crew taking refuge beneath the engine. Relating their experience afterward these trainmen rather 'swanked' about it over their inexperienced brothers.

"The spirit of adventure is strong throughout the American ranks and the engineers who so far have not been bombed are openly jealous of their more 'fortunate' comrades. So far none of the regiment has been under shell fire, but the men may yet have a taste of the noisy German 5.9s and the whistling 'Percys,' 'Wooly Bears' and 'Whiz-bangs.'

"There is a great spirit of comradeship among the officers and men, most of whom have worked together and have known each other for years. The regiment is known as an operating unit as opposed to the engineers enlisted as construction units.

"Before proceeding to the front the regiment was quartered in a little French town within the zone of the French army. The arrival of the Americans at this town was kept secret and they marched into the place late at night after all lights had been extinguished. The soldiers were not allowed to smoke, strike matches or say a word. Despite the stealthy entrance, however, the French townspeople knew quickly of the arrival and soon the streets were filled with a quiet throng which joined in among the Americans and paraded with them arm in arm.

"It was one of the strangest welcomes any troops probably ever received anywhere, but it was at the same time one of the most sincere."

AN ABLE LOOKING BODY OF MEN

Speaking also of this regiment, Lincoln Eyre, staff correspondent of the New York World, in a copyright despatch, said last Friday: "I accompanied the engineers to the front from the base town in which they had been spending a month for instructional purposes. Nowhere among the American troops in France have I seen a higher spirited or abler looking lot of men. Their hilarity as they entered the train which was to carry them to their corner in a famous battle region almost shocked the poilus watching them. After three years of it there is no laughter in a Frenchman's heart when he sets out for the front. With him it is just a grim job that has got to be done; with these railroaders it is adventure, romance, opportunity for glorious achievement. They are fired with enthusiasm for everything and everybody—for their country, for every reason one can imagine, for France for which they are to do their bit, for Great Britain where they landed and received a boisterous welcome, for themselves because they are picked men and know it. . . .

"From their spaciiously comfortable barracks, especially cleaned, white-washed and disinfected for *les Americains*, in which the engineers spent their first month in France, they

moved in troop trains, motor trucks and automobiles to villages in the region where they will pass the winter. Their headquarters is established at a point carefully chosen with a view of its proximity to the principal stations on the railroad they have already begun to operate.

"This line, which is of course military and one of the chief feeders of a French army, is manned by both French and American engineers. In a very short time, however—as soon, in fact, as they have mastered the details of the French methods of operation, which, being under the direction of the French, they will adopt in every particular—the regiment will run the road entirely by themselves from top to bottom. They will then form one of the engineering units of this French army.

"The French will supply them with rations and quarters. There is universal satisfaction, I found, with both. The engineers are housed in well built wooden huts, with plenty of light and air, and are fed so well they have almost forgotten to yearn for the flesh pots of home. At the officers' mess, at which I was a guest, the luncheon dished up by a French chef provoked comparisons with food at some of New York's high priced restaurants highly unfavorable to the latter."

FIVE AIR RAIDS IN FOUR DAYS

Many interesting letters have been received recently from members of railway regiments in France. The letter of which the following is a part was received from a member of the Thirteenth Engineers (Railways), the regiment which was quartered at Chicago before leaving for Europe:

"For interest and thrills this place (somewhere in France) beats anything I've ever struck in the short and varied career of my sweet young life. About an hour ago the alarm was sounded—German air raid! Everybody is supposed to duck into a bomb proof. I tried to get up on to a roof to see the big scrap and nearly landed in a cell as a result. They've apparently located our regiment, as we've had five air raids in four days.

"We spent two days in an English camp, crossed the channel in a cattle ship with a Chinese crew—no bunks—slept on deck. Obeying orders, I was completely surrounded by a life preserver until we landed. Then there was a long ride in a day coach, and we arrived at our present location at midnight. The entire population of the town and surrounding country was on hand to welcome us. No lights were permitted to be shown at night. Under the very dim light of a shaded lantern, the general in command of the French bade us welcome. Our colonel replied in a graceful speech and we marched three miles through inky darkness to barracks.

"There was no keeping the crowd back. White-haired men and women and little boys and girls crowded into the ranks as we marched. They hung on to our blouses, wrung our hands, laughed, cried, and sang. We were the first American regiment to get up within sound of the guns. Far off on the horizon the sky was illuminated at frequent intervals by the explosion of light bombs and the fire of the heavy artillery."

PARADE IN LONDON

Another member of the same regiment, Ernest J. Carr, writes that he was the first American who ever carried the American flag before the king of England. He wrote:

"We were in London for a day, and the whole regiment, together with other railway engineer regiments, paraded through the streets. We saw all the places of note—Buckingham palace, houses of parliament, river Thames, Wellington barracks, and several other places. King George of England reviewed our regiments in front of Buckingham palace. There was a long article about us in the London Mirror, as well as in several London daily papers.

"I carried the American flag past King George and he saluted. Ours were the first American troops, also the first armed troops of any foreign nation to pass through the streets of London and past the king of England. I am the first American in all history to bear the American flag before the king of England.

"The London Mirror carried a picture of me and the other color sergeant, and guards . . . The people of London turned out by the thousands. Everywhere we received a warm welcome. They cheered the troops and the flag all along the line."

A letter from Ralph C. Wirth, Company C, Thirteenth Engineers, states that following the review of the regiment by the king and queen of England, a light lunch was served the troops in Green Park, which is for the private use of the English royal family. He also states that following their arrival at Liverpool on August 12, the regiment engaged in gas drill at a training camp for five days. By "gas drill" is meant practice in the use of measures to protect the men from German gas bombs.

NEWSPAPER COMMENT ON PARADE

A London newspaper clipping received from an American engineer indicates what a holiday the English made of the parade of American soldiers:

"Very early in the morning people discovered their viewpoints and waited patiently watching the enormous crowds that joined us. Traffic was diverted or stopped altogether. Shops were shut and business suspended and later the meeting of the War Cabinet itself was adjourned so that the prime minister and his colleagues might become as the people of the streets making greeting to the men who 'mean to see it through.' . . . Londoners are not very ready to cheer. Theirs is the way of silent tribute. But yesterday they forgot the silly traditions of British reserve. They might have been Irish or Italian in their wild enthusiasm. For, as the first Americans were seen, cheers were raised such as have never been heard in London. . . . Louder and still louder rose the cries as the Stars and Stripes came in view. Soldiers in the crowd saluted; men raised their hats, and women threw their flowers and waved their handkerchiefs—and some of them sobbed happy tears of pride such as no man or woman need remember with shame."

Sergeant H. W. Hofmann of the Thirteenth Engineers writes of the difficulty encountered in speaking with the French: "Usually carry a French-English book containing common phrases and after searching through the book about an hour and going through two or three million motions, succeed in completing a sentence. When going to a restaurant in town to get something to eat I've found the best plan to go to a place where only table d'hôte meals are served. Had almost as much trouble understanding the lingo of those cockney Englishmen, while we were in England, as we do the French."

NEAR VERDUN

Another member of the same regiment writes: "Are now quartered in very comfortable barracks, in a large town about 20 miles from the firing line and about 30 miles from Verdun, and can plainly hear the roar of the big guns night and day. Airships are active overhead all the time and have witnessed several air battles. This town is frequently bombed by the German raiders and usually at night. I was in London several Sundays ago when the city was bombed in an air raid, and several people were killed. . . . Tobacco is high here and doubly so in England, where 24 cents is charged for a five-cent sack of Bull Durham and 44 cents for a ten-cent can of Tuxedo. . . . I made an interesting trip this morning to an old battlefield and went through some of the trenches that the Germans have used. I could get wagon-loads of souvenirs if I wished."

Brake Pipe Leakage and Compressor Capacity*

Testing Train Leakage by Charging Through an Orifice Designed to Supply Maximum Allowable Leakage

By C. R. Weaver

Supervisor Air Brakes, New York Central, Cleveland, Ohio.

IT has been customary to determine the brake pipe leakage by making a 10 lb. brake pipe reduction, lapping the brake valve and noting the rate of drop in brake pipe pressure. Then, knowing the volume of the brake pipe, it is possible to calculate the cubic feet of free air lost from the brake pipe, during the first minute. This figure is commonly accepted as a measure of the relative condition of trains on the road with respect to leakage from the brake system.

After an extended investigation of long freight trains, the writer was convinced that the information so obtained was of little value and rather misleading than otherwise. Trains were found on which the brake pipe leakage, as noted above, was not excessive, and the compressor capacity ample to supply the air required for maintaining the pressure in the brake system, but subsequent observations on the road showed the compressor capacity insufficient to supply the air lost.

There are several causes for apparent disagreement of such observations, namely:

(1) Opening up of leaks in hose couplings and pipe connections when the train is in motion that do not exist when the train is standing.

(2) Leakage caused by movement of apparatus when running due to insecure fastening of reservoirs or brake cylinders to the car body.

(3) Leakage from the auxiliary reservoir side of the triple valve piston caused by leaky gaskets, leaky release valves, etc.

How much influence these causes may have is uncertain, but the fact remains that trains having no more brake pipe leakage, measured in the usual way, than could be easily supplied by the compressor capacity, have been found in numerous cases to overtax the compressor, causing its failure.

It is very difficult to ascertain brake pipe leakage, in fact, it can only be done by closing all the triple valve cut-out cocks throughout the train, which is impracticable and of little value, since it is the volume of air that escapes from the system that is now the vital consideration as far as train movements are concerned, i. e., time to charge the brake system and to restore and maintain the required pressure.

There is, however, another side of this: viz., the effect of the brake pipe leakage on the operation of the brakes, such as lessening the ability to release all the brakes in the train, and lengthening the time in which they can be released. The leakage may also become so great that a brake application commenced by the engineer may result in a continuous application of the brakes. However, this is hardly likely to become serious with the long, large volume air brake trains of today, since the capacity of the compressor, the limitations of transmission of the air by the passageways of the brake valve and feed valve, and the ability to transmit air in sufficient quantity through the pipes of the present long trains will be exceeded before the brake pipe leakage, in pounds per minute, has any serious effect upon the operation of the brakes.

The whole question of brake pipe leakage resolves itself into what quantity of air may be permitted to escape from the brake system and still permit charging, maintaining and re-

plenishing the brake system in such time as will not impose limitations upon traffic in the way of delays, getting trains ready in the yard, and operating them over the road.

It is very difficult to ascertain what quantity of air is actually leaking out of the brake system. It is not difficult to find out what drop takes place in the pressure, but this varies owing to variations in methods of making tests, positions assumed by triple valves, etc. It is not difficult, however, to fix on some quantity of air that may be permitted to leak out of the brake pipe and then supply in the yard this quantity of air to a train previously charged and observe whether or not the quantity supplied does, or does not, maintain the required pressure. If it maintains or more than maintains the pressure, it is apparent that the leakage of the train is no more than can be permitted. If it does not maintain the pressure then the leakage must be reduced to the point where it can be maintained. The permissible amount of leakage from the entire brake system is the starting point. Too much leakage must not be allowed or an undesirably large compressor capacity or high degree of compressor maintenance will be necessary. An excessively low amount of leakage must not be insisted upon, or traffic will be interfered with on account of the time required to stop the leaks.

In order to arrive at some basis of what would be the allowable leakage, the Interstate Commerce Commission condemning tests of air compressors is the basis of the available compressor capacity. This, by the way, in the writer's opinion allows too wide a variation in the condemning tests. A New York No. 5 compressor is only required to deliver 59 cu. ft. of air, which is only 65.5 per cent of its capacity when in good condition, whereas the 8½-in. cross-compound compressor is required to deliver 86 cu. ft. of free air, which is 90.5 per cent of its good condition performance.

DETAILS OF TESTS

It was decided to determine the leakage by means of an orifice through which air would be supplied at a definite pressure which would be sufficient to provide for the maximum amount of allowable leakage. If, with this arrangement it was not possible to maintain the pressure in the brake pipe, then the leakage was too great. If the brake pipe pressure remained the same, or was raised, it would then be known that the leakage was not excessive. The tests were made on a 100-car freight train, conforming to the following specifications:

Size of equipment, 10-in. (combined); length of cars, 42 ft.; brake pipe volume per car, 920 cu. in.; auxiliary reservoir volume, 2,440 cu. in.; leakage uniformly distributed at car 4 and every tenth car up to and including car 94, regulated by cocks in branch pipe near triple valve; test gages on branch pipes of cars 1 and 95 and on auxiliary reservoir of car 1.

The locomotive equipment was as follows:

Brake equipment, No. 6 ET; main reservoir volume, 50,000 cu. in.; main reservoir pressure, duplex control 100 lb. and 130 lb.; compressor, two 9½-in. or one 8½-in. CC.; steam pressure, 195 lb. to 210 lb.; test gages on main reservoir and brake pipe.

The orifice was placed between the yard air system and the train with a by-pass in which was placed an air meter

*Abstract of paper presented before the September meeting of the Central Railway Club.

(Toolometer) by means of which the amount of air passing through the orifice was determined.

Two main classes of tests were made which may be referred to as charging tests and pump up tests. The first charging tests were made with an orifice 17/64 in. in diameter, which was computed to furnish an amount of air equivalent to 75 per cent of a New York No. 5-A compressor capacity. With this orifice and a constant pressure of 80 lb., the brake pipe leakage was regulated until the air flowing through the orifice was just able to maintain 70 lb. pressure in the brake pipe of the first car. By means of the Toolometer it was found that this rate was 41 cu. ft. of free air per minute.

This rate was used as a basis for making the pump up tests, using the locomotive with two 9½-in. compressors and 200 lb. steam pressure. Fig. 1 shows a graphic record of the results of the pump up test in which an empty train was charged to a pressure of 70 lb. on car 1. The train was charged with the brake valve in running position. When the first car of the train was charged to 70 lb., an attempt was made to raise the pressure to 85 lb. by placing the brake valve handle in full release position. After more than 20 minutes the pressure became stationary at 82½ lb. By means of the orifice, the yard plant apparatus and the Toolometer, it was found that 50.4 cu. ft. of free air per minute was required to maintain the total train leakage under these conditions.

It was then concluded that the total leakage rate of 41 cu. ft. of free air per minute at 70 lb. pressure on the first car was too great. The orifice was therefore replaced with one of ¼-in. diameter. This showed that 70 lb. could be maintained on the first car with an 80-lb. yard pressure, with a total leakage rate of 35 cu. ft. of free air per minute. The pump up test was then repeated and the brake pipe pressure on the first car was raised from 70 lb. to 85 lb. in about 15

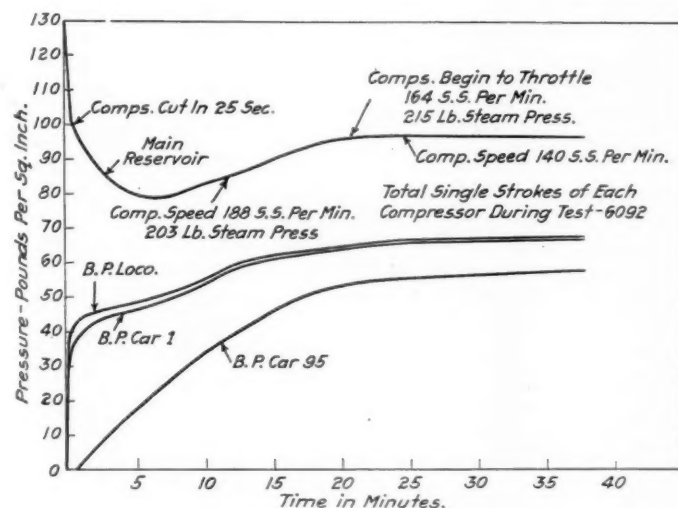


Fig. 1—Time of Charging Train with Leakage of 41 Cu. Ft. per Minute; Brake Valve in Running Position

minutes, thus showing that the ¼-in. orifice was suitable. Fig. 2 shows a graphic record of the second series of pump up tests where the leakage had been reduced to 35 cu. ft. of free air per minute.

Other tests were made to show how time could be saved in charging the train by placing the brake valve in the release position until the train had been nearly fully charged, then moving it to a running position, thus bringing the feed valve into operation so that it would not be overcharged. Tests were also made to determine the best way of handling the yard charging orifice. The Toolometer readings were checked and found to be sufficiently accurate.

CONCLUSIONS

The ordinary method of measuring brake pipe leakage on trains is not an accurate check on the total amount of train leakage which the compressor on the locomotive must be able to supply if the train is to be handled successfully.

The method suggested for measuring the total leakage by charging the train through an orifice supplied with a fixed pressure does not afford an accurate means of measuring the total train leakage.

If the maximum permissible amount of train leakage is

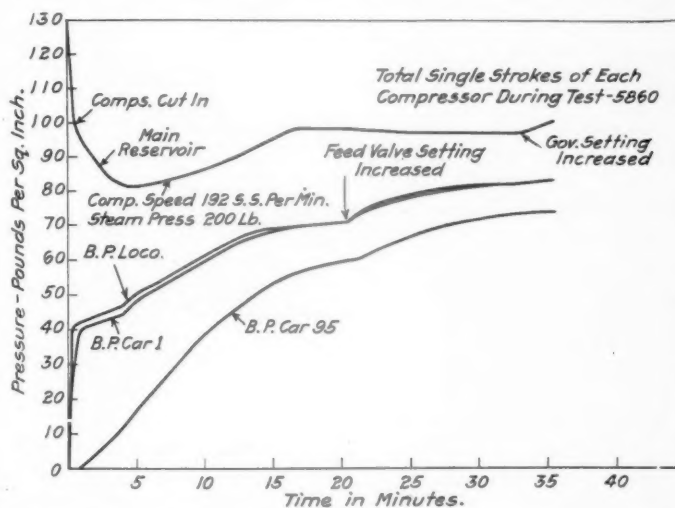


Fig. 2—Time of Charging Train with Leakage of 35 Cu. Ft. per Minute; Brake Valve in Running Position

fixed upon, an orifice size can be determined which when supplied with a constant pressure of 80 lb. from a yard plant will just supply the necessary amount of air to the train to maintain the leakage specified.

Such a charging orifice can conveniently be used while charging a train from the yard plant and it will afford a means for accurately determining whether the total leakage of the train is less than, equal to or greater than the maximum permissible leakage.

The best method of manipulating the charging orifice test apparatus is for the operator to start the test with the by-pass around the orifice open and then as the train charges gradually close this by-pass so as to maintain 70 lb. brake pipe pressure on the first car of the train. This method will accomplish the charging of the train in a minimum of time and avoid any objectionable overcharging.

The foregoing seems to point out the necessity of a better brake maintenance and a better initial installation of the brake apparatus; this has particular reference to securing the reservoirs and cylinders to the car body and proper clamping of the brake pipe. A large majority of the leaks are due to loose reservoirs, cylinders, and brake pipes. Tightening of the unions when these parts are loose only affords temporary relief. More attention should be paid to hose couplings when mounting hose, as many are found that do not gage and when coupled, leak.

A recent investigation of 12 trains, varying from 80 to 114 cars per train, showed a loss of air from 30 per cent to 93 per cent of the compressor capacity. Losses of this kind are not only expensive in compressor maintenance and coal consumption, but cause serious delays to traffic.

The writer wishes to express his appreciation to the Westinghouse Air Brake Company for assistance in conducting the tests and compiling the test data.

DISCUSSION

The discussion indicated a general appreciation of the seriousness of train leakage on roads handling trains approach-

ing and often exceeding 100 cars. Not only has the difficulty of maintaining and supplying adequate train pipe pressure been increased by the handling of long trains, but heavy cars and the severe shocks which result from rough handling have greatly added to the difficulties of maintaining a reasonably tight train line. Under these conditions, reservoirs inadequately secured and pipes not sufficiently clamped, are soon jarred loose and excessive leaks result. The need of co-operation between the maintenance forces and designers, in order that the location of the air brake equipment and the methods of securing it to the car may be such that it will adequately perform its functions, was pointed out.

The opinion was expressed that the time has arrived when a complete system of piping designed especially to meet the requirements of locomotive and car service is needed. The piping now in use is not essentially different from that used for gas and water in our houses under the most favorable conditions so far as external stresses are concerned; it is an adaptation of existing facilities not well suited to meet the entirely different conditions under which they must operate. Attention was called to the frequency with which a poorly designed piping layout is found on hopper bottom cars where the reservoir is often placed directly over the train pipe with a branch pipe not over 12 in. or 14 in. long, and this made up largely of elbows and couplings. With the train pipe located between the center sills it is often impossible to locate, much less attend to repairs to a leak when it is located.

One of the most prolific causes of train leaks is inadequate reservoir fastenings which permit the reservoir to become loose under the stresses imposed in service. It is usually the practice to leave the stopping of leaks until trains have been made up and tested in the yards. Under such conditions time does not permit of doing more than patching up unions and other similar repairs, the result being that leaks caused by loose reservoirs are immediately opened up again as soon as the train is in motion. It was suggested that such repairs might well be made on the house track while cars are being loaded, at which time the leaks could be permanently stopped and delays in despatching trains materially reduced.

APPROPRIATION FOR TRANSPORTATION

A total of \$350,000,000 for the transportation of the army and its supplies is provided for in the deficiency appropriation bill passed by the House on September 18 and sent to the Senate. The provisions governing this expenditure are as follows:

"For transportation of the army and its supplies, including transportation of the troops when moving either by land or water, and of their baggage, including members of the Officers' Reserve Corps, enlisted men of the Enlisted Reserve Corps, and retired enlisted men when ordered to active duty, including the cost of packing and crating; for transportation of recruits and recruiting parties; of applicants for enlistment between recruiting stations and recruiting depots; for travel allowance to officers and enlisted men on discharge; for payment of travel allowance as provided in section 126 of the act approved June 3, 1916, to enlisted men of the National Guard on their discharge from the service of the United States, and to members of the National Guard who have been mustered into the service of the United States and discharged on account of physical disability; for payment of travel pay to officers of the National Guard on their discharge from the service of the United States, as prescribed in the act approved March 2, 1901; for travel allowance to persons on their discharge from the United States disciplinary barracks or from any place in which they have been held under a sentence of dishonorable discharge and confinement for more than six months, or from St. Elizabeth's Hospital after transfer thereto from such barracks or places, to their homes (or elsewhere as they may elect), provided the cost

in each case shall not be greater than to the place of last enlistment; of the necessary agents and other employees, including per diem allowances in lieu of subsistence not exceeding \$4 for those authorized to receive the per diem allowance; of clothing and equipage and other quartermaster stores from army depots or places of purchase or delivery to the several posts and army depots and from those depots to the troops in the field; of horse equipment; of ordnance and ordnance stores, and small arms from the foundries and armories to the arsenals, fortifications, frontier posts, and army depots; for payment of wharfage, tolls, and ferriages; for transportation of funds of the army; for the hire of employees; for the payment of army transportation lawfully due such land-grant railroads as have not received aid in Government bonds (to be adjusted in accordance with the decisions of the Supreme Court in cases decided under such land-grant acts), but in no case shall more than 50 per cent. of full amount of service be paid: *Provided*, That such compensation shall be computed upon the basis of the tariff or lower special rates for like transportation performed for the public at large and shall be accepted as in full for all demands for such service: *Provided further*, That in expending the money appropriated by this act a railroad company which has not received aid in bonds of the United States, and which obtained a grant of public land to aid in the construction of its railroad on condition that such railroad should be a post route and military road, subject to the use of the United States for postal, military, naval, and other Government services, and also subject to such regulations as Congress may impose restricting the charge for such Government transportation, having claims against the United States for transportation of troops and munitions of war and military supplies and property over such aided roads, shall be paid out of the moneys appropriated by the foregoing provision only on the basis of such rate for the transportation of such troops and munitions of war and military supplies and property as the Secretary of War shall deem just and reasonable under the foregoing provision, such rate not to exceed 50 per cent. of the compensation for such Government transportation as shall at that time be charged to and paid by private parties to any such company for like and similar transportation; and the amount so fixed to be paid shall be accepted as in full for all demands for such service: *And provided further*, That nothing in the preceding provisos shall be construed to prevent the accounting officers of the Government from making full payment to land-grant railroads for transportation of property or persons where the courts of the United States have held that such property or persons do not come within the scope of the deductions provided for in the land-grant acts; for the purchase and hire of draft and pack animals in such numbers as are actually required for the service, including reasonable provision for replacing unserviceable animals; for the purchase, hire, operation, maintenance, and repair of such harness, wagons, carts, drays, other vehicles, and motor-propelled and horse-drawn passenger-carrying vehicles, as are required for the transportation of troops and supplies, and for official, military, and garrison purposes; for drayage and cartage at the several depots; for the hire of teamsters and other employees; for the purchase and repair of ships, boats, and other vessels required for the transportation of troops and supplies and for official, military, and garrison purposes; for expense of sailing public transports and other vessels on the various rivers, the Gulf of Mexico, and the Atlantic and Pacific Oceans, \$350,000,000."

CANADIAN RAILWAYMAN HONORED.—Lieut.-Col. C. W. P. Ramsay, chief engineer for construction, Eastern lines, Canadian Pacific Railway, and now with the Canadian Army in France, has been made a Companion of the Order of St. Michael and St. George.

HALF MILLION TROOPS MOVED BY RAIL

With words of the highest praise for the railways, Secretary of War Baker announced on Monday that since early in August, when large troop movements began, the roads had transported 502,000 soldiers to training camps, cantonments and seaports without any serious derangement of their regular passenger schedules and without serious injury to a man.

"This strikingly illustrates," said Secretary Baker, "the patriotic co-operation of the railroads with the government and also the tremendous capacity of American railways. I think the railroads deserve great credit for this achievement."

The figure used by Secretary Baker, which represents the



Good Bye, Broadway—Hello, Camp Upton

total up to Sunday night, and covers approximately half of the initial movement now under way, includes the units of the regular army and the railway engineer regiments that have gone to France, those of the National Guard units that have been moved to training camps, and the first two increments of the 687,000 selected for the National Army that have been moved from 4,531 local concentration points to their 16 cantonments.

The National Guard movement, which began early in August, includes about 300,000 men and their impedimenta. The National Army movement began on September 5-9 when about 5 per cent of the total, or approximately 35,000 men, were transported. These were handled on regular passenger trains, one-fifth starting from their originating points on each of the five days, and required no special schedules. The second increment of 40 per cent, or approximately 275,000 men, were entrained from September 19 to 23; another 40 per cent is to be entrained from October 3 to 7 and the remaining 15 per cent beginning October 19. During the transportation of the second increment of the National Army the movement of the National Guard was temporarily postponed, to be resumed early in October.

From most of the local concentration points only a few men were moved at a time, special trains being required only for the contingents from the larger cities, but as the cantonments were approached the movement became more concentrated and extra coaches were attached. When these reached a certain number they were detached from the regular trains and made up into special trains. Day coaches were used for the shorter trips and tourist sleepers for those located farthest from the cantonments.

Under the arrangements worked out by the American Railway Association schedules were prepared by the passenger associations in conference with representatives of the operating departments and then approved by the Quarter-

master General. Orders were issued that passenger equipment be immediately emptied upon arrival and immediately returned to the road from which received. Orders for the disposition of Pullman equipment released were waiting for the cars at destination.

When requests for such information were made, the railroad officers were authorized by the Quartermaster General to confidentially notify Red Cross officials at points where troop trains were scheduled to stop of the expected time of arrival, in order that the Red Cross organization could give attention to the troops in transit. Where troop trains contain both passenger and freight equipment, the Railroads' War Board has ordered that the freight cars should always be on the rear of the train. This permits proper heating of coaches and Pullman cars when the weather requires it.

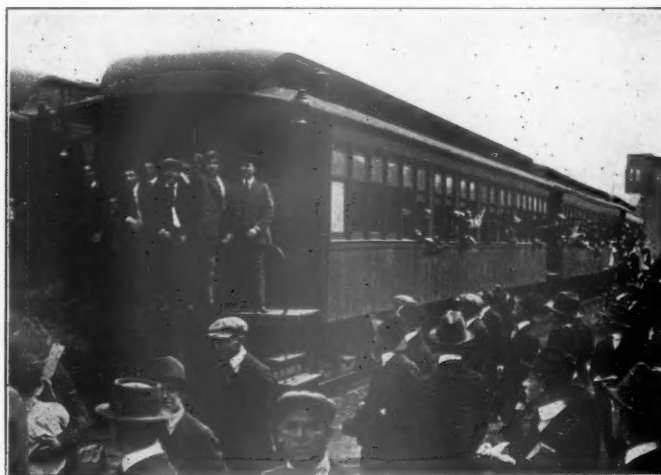
The Adjutant General has issued a circular to all department and division commanders directing commanding officers of troop trains when arranging stops en route for feeding, watering and resting animals to co-operate with the operating officials of the railroads in having such stops made, as far as circumstances will permit, at such time and place as will be agreeable to the operating requirements and needs of the railway service.

THE Y. M. C. A.

Secretaries of the Railroad Y. M. C. A. accompanied about 200 of the trains carrying drafted men in the second contingent of 40 per cent to the cantonments. These secretaries told the men about the work of the Y. M. C. A. in the camps and overseas. They distributed magazines and stationery, and by this means and through personal contact in other ways made the trip an easier one for all concerned, the soldiers-to-be themselves, the men in charge and the train crews.

HANDLING TROOPS TO CAMP UPTON

Camp Upton, on Long Island, by last Sunday night had received not quite 11,000 of the camp's quota of 43,000 men for the new National Army. These men had been arriving on special trains from New York City the five preceding



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The Last Chance to See the Selected Men in "Mufti"

days and will be adjusted to their new surroundings when a similar number follow them late this week.

The camp will train for the National Army the men from New York City, those from Westchester, Putnam and Dutchess counties, on the east side of the Hudson river just to the north of New York, and those from Nassau and Suffolk counties making up the remainder of Long Island outside of New York City.

The camp itself lies just to the north of the main line of the Long Island Railroad between Yaphank and Manorville stations and is about 63 miles east of New York City. The

railroad is single track from Hicksville, which is about half way to the camp, so that the extensive passenger and freight traffic required for the camp has to be handled accordingly.

The movement of men to the camp practically all comes through New York, Brooklyn or Long Island City and is complicated by the necessity of using electrically operated steel equipment through the tunnels under the river out of the Pennsylvania Station, or the subway out of Flatbush Avenue Station in Brooklyn and of transferring to the steam operated wooden equipment beyond. The road, following its usual practice, has worked out the scheme of carrying the men in multiple unit electric trains out of these two stations and of transferring them car by car at Jamaica, the general transfer point, 11 miles out.

The various draft boards bring their quotas on foot, in automobiles or trolley cars to the stations, and each lot of men is kept together in one or two cars. The second movement, which began Wednesday and ended Sunday, required three or four trains daily, each train consisting of from 10 to 14 cars. The trains came through the 63 miles in about three hours, which is very good, considering the fact that the line is only single tracked and is now carrying far more than its accustomed amount of both freight and passenger business. The men from the different boards remain in charge of a member of the board, but at Medford, two stations before the camp, the train is boarded by army officers, so that when it arrives at the Camp Upton station the men can be taken off the train and marched immediately to their new barracks.

One of the interesting features of handling the trains has been the work of the Y. M. C. A. Thus far the Railroad Y. M. C. A. has been able to have a secretary on all but two trains. This representative has introduced the Y. M. C. A. to the men and gotten them interested in the work it is planning to do at the camp and has also helped the railroad and the army officers to no small degree in getting the men ready to receive the officers at Medford.

The Long Island is one of the few roads of the country



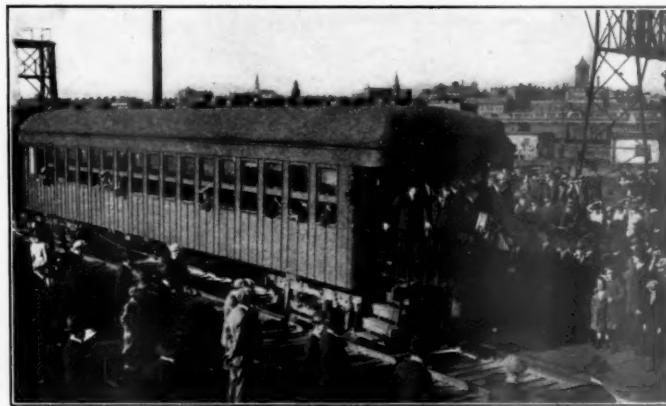
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Express—No Sleepers.

that has had to handle a movement to a cantonment almost exclusively. It has also had to move large numbers of visitors to Camp Mills at Mineola where the Rainbow Division, 27,000 strong, is encamped, awaiting orders to embark for France. Fortunately the Long Island is a passenger railroad and this new traffic has come after the summer rush is over. There has thus far been no serious shortage of cars or of locomotives.

The facilities for receiving the men at Camp Upton are fast being put in readiness. There are now two stations at the camp, one on the main line and one on a wye which

extends north into the camp proper. The total trackage laid down was approximately 11 miles in length, three-quarters of a mile for a siding on the main line, $3\frac{1}{4}$ miles for a temporary contractor's siding and a little over seven miles for the permanent layout for the camp itself. This permanent trackage includes a wye to facilitate operation, a freight yard for about 100 cars, an engine yard and also serves a row of 10 government warehouses, an l. c. l. freight station, team tracks, etc., and the passenger station, now in process of construction. The passenger station tracks are four in number, each long enough to hold a good-sized train and with wide gravel platforms between. The Long Island for some time has been handling the camp laborers to its main line



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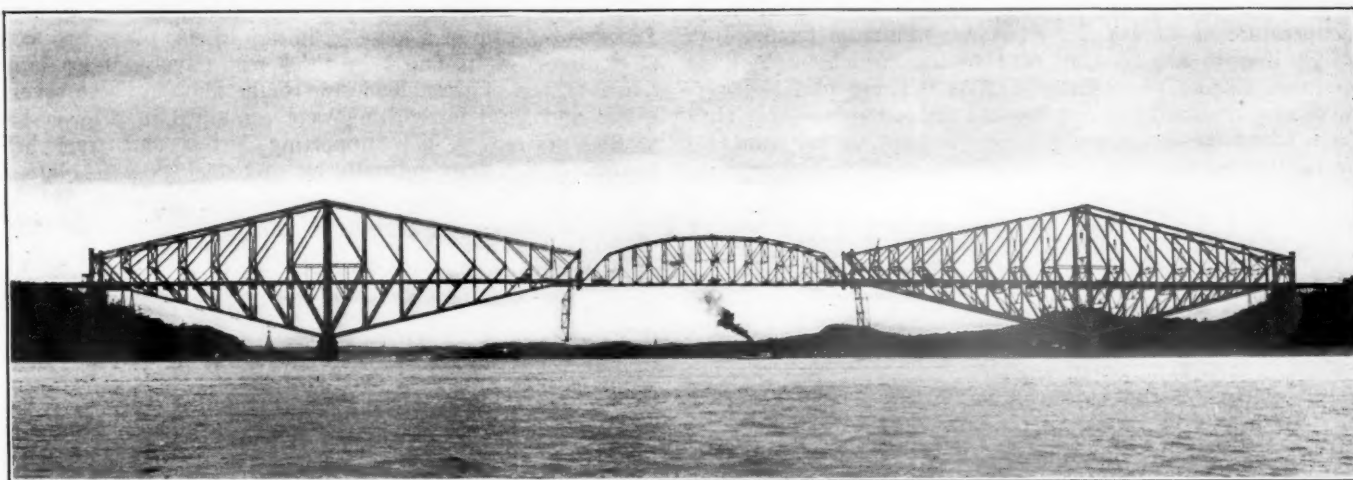
A View from Another Railroad. Leaving North Station, Boston, for Camp Devens

station, and it has been doing an exceedingly large business, because the mosquitoes drove the contractors' men both to distraction and home. Conditions, of course, are much better now. The Long Island at one time had to bring down and carry back its own laborers in a work train each day, because the men refused to board at the camp even at increased wages. The road now has facilities for 98 clerical and other employees at the camp, including comfortable offices, barracks and an attractive eating place at which the men can obtain meals at 25 cents each. Until these buildings were ready these men had to work in converted passenger cars; at one time the freight office with about 28 clerks had its headquarters in a single car.

SPECIAL RATES FOR SOLDIERS

The special trains for drafted men come, of course, to the station on the wye. The Long Island will shortly begin to make a much more extensive use of its camp station, however, because it will establish a schedule of five camp specials each way daily. On four of the westward trains (to New York), all in the evening, and on two of the returning trains, leaving New York at 9:29 and 11:44 in the evening, respectively, for soldiers only,—officers and enlisted men in uniform,—will be allowed a special rate of 60 cents for the round trip, this being at the rate of less than one-half cent a mile. On the other specials, for visitors and soldiers, soldiers will pay \$1.20 for the round trip. Visitors on these specials will be given a special rate of \$2.50 for the round trip, and even this is a considerable reduction, for the regular fare is \$3.54. The specials will make only one stop—at Jamaica—where passengers will change cars for the New York or Brooklyn stations.

RUSSIAN RAILWAY LOAN.—The Petrograd newspapers announce the forthcoming issue of a second so-called railway loan. The money will be used for 17 railway companies which have been taken over by a syndicate of banks. The loan will be for rubles 750,000,000 (\$386,000,000), the rate of interest $4\frac{1}{2}$ per cent, and the price of issue 81 $\frac{1}{3}$.



The Bridge Showing the Suspended Span in Place

Quebec Bridge Central Span Successfully Hoisted

Roller or Key Bearings Used as Supports During
Raising Instead of Rocker Bearings and Steel Castings

By A. J. Meyers

Chief Draftsman, Board of Engineers, Quebec Bridge

ONE of the greatest feats of bridge engineering the world has ever seen was brought to a successful conclusion on Thursday, September 20, 1917, at 4.01 p. m., when the 10-in. pins connecting the two sections of the eyebars suspending the new suspended span of the Quebec bridge to the ends of the cantilever arms were driven. This span is 640 ft. long center to center of end supporting bars, 88 ft. wide center to center of trusses and 110 ft. deep center to center of chords at the center of the span. When completed and ready for hoisting into its final position, it weighed practically 4,950 tons. The cantilever arms are each 580 ft. long, and with the placing of the suspended span the task of bridging a clear distance of 1800 ft.—the longest span in the world between main piers—had been completed. The two adjacent anchor arms are 515 ft. long and the depth over the main pier is 310 ft. from center of the main shoe to the center of the top chord connecting links.

DETAILS OF DESIGN

The trusses of the span have the top chords curved to a parabola, the depth at the hip being 70 ft. and at the middle of the span 110 ft.. The web is a sub-panel Pratt system with main verticals compression posts, except the vertical hangers at the hip, which with the main diagonals are tension members. The main panels vary in length from 65 ft. in the end panels to 80 ft. for the panels at the center of the span. For the bottom chord throughout and for the first main tension diagonals of the web eyebars were used. All the other truss members were of built up construction. The top chords were pin-connected at all the main panel points with shop or field splices at the intermediate sub-panel points. Nickel steel was used throughout for all the main truss members and the top and bottom lateral systems, but the sway bracing and the minor web members, which carried no moving load stresses, were made of carbon steel. The greatest area of the top chord members was 434 sq. in., and in the center panel of the bottom chord eyebars 311.5 sq. in. The top and bottom lateral systems, as well as the sway bracing, were double intersection systems, designed to take both tension and compression in each member.

The manufactured length of the truss members was such

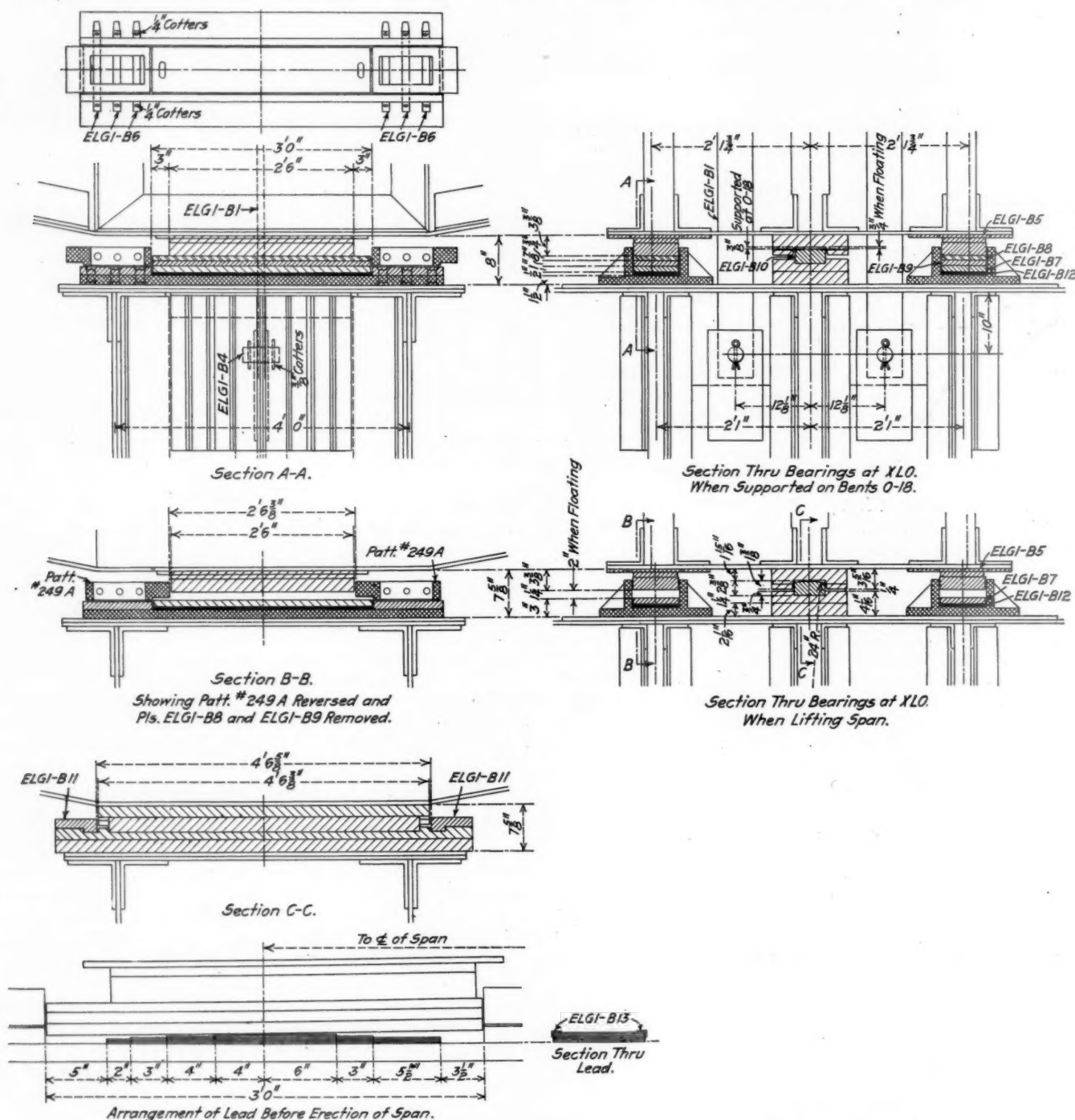
that after the span was erected and carrying its full live and dead load the trusses would have their geometrical shape, that is the main truss members would be straight between main panel points. For this reason the faced ends of the top chords, where these members are spliced in the field, would not come to a square bearing during erection. In order to obtain a square bearing at these points before riveting on the splice material, a special method of erection had to be adopted. Sand-jacks were placed on top of the outside columns of the staging bents at the main panel points, the main vertical posts of the span bearing on these jacks. At the sub-panel points, and between the inside columns of the staging bents and the floorbeams, wood blocking was used in place of the sand-jacks. The elevations of the bottom chord panel points during erection were calculated to suit the manufactured length of the truss members, or in other words the camber of the truss. The span being completely erected, except for the riveting of the top chord splices which had only been bolted up with 50 per cent of the field holes filled with bolts, the timber blocking between the floorbeams and inside columns of the staging and also between the sub-verticals and outside columns of the staging, was removed and the sand-jacks were lowered until the span rested on its bearings at the end staging bents which then carried the full dead load. The nuts on the bolts in the top chord splices were then loosened, and the bearing surfaces allowed to come squarely together; the lengths of the sub struts supporting the chords at the splices having been calculated so that the chords would be straight between main panel points for this condition. The chord splice material was then fully riveted.

BEARINGS RADICALLY CHANGED

The design of the bearings which on this occasion transferred the load of the suspended span to the lower supporting girders was radically different from the bearings of last year. After the intermediate falsework bents were removed and the span rested on the end bents at LO and L18, the reaction of the span was borne by part bearings under the two outside ribs of the XLO joint, specially designed to take care of the expansion and contraction of 3 to 3½ in. at each

end of the span. This motion was due to a variation in temperature of 90 deg. F. or from a minimum temperature of 30 deg. to a maximum of 120 deg., which might have occurred during the summer months. These part bearings were also designed to accommodate the rotation of the XLO joint about the transverse axis of the joint, as the span deformed under the dead load stresses when the initial erection

The lower portion of the outside bearing was $4\frac{5}{8}$ in. thick and was built up of a loose $\frac{3}{4}$ in. top bronze plate, two loose steel plates, $\frac{7}{8}$ in. and 1 in. thick respectively, and a laminated section of sheet lead, $\frac{13}{16}$ in. thick. These several plates and sheet lead filling were contained in a lower bed casting riveted to the supporting girder and were held against motion longitudinally by cast steel blocks, bolted in



Details of the Supporting Bearings. These Took the Place of the Rocker Bearings Used Last Year

camber was eliminated and the span rested entirely on the end supporting bents.

The upper portion of the outside bearing was $3\frac{3}{8}$ in. thick and was riveted to the bottom of the XLO joint. It was planed on the under surface and also on the edges to a width of $7\frac{7}{16}$ in. and to a length of 2 ft. 6 in. and slid when the span was expanding or contracting on the polished and paraffined surface of the top bronze plate of the lower portion of the bearing, at the same time being guided and contained by the planed sides of the lower bed casting.

the ends of the trough of the bed casting by three 1-in. diameter through bolts. Three-inch clearance was allowed between each end of the upper and lower portions of the bearing for longitudinal motion. The sheet lead filling, which was $\frac{13}{16}$ in. thick before taking load, flowed under the reaction of the span and took care of the rotation of the XLO joint about its transverse axis as the members of the span changed their lengths under varying stresses and conditions. In order to prevent the sheet lead from squeezing out around the edges of the loose steel plates in the lower bed casting a

sheet steel retaining collar was used. Measurements taken after the full reaction of the span had been carried by the sheet lead for several weeks, showed that the sheet lead had squeezed down to an average thickness of from $\frac{1}{2}$ in. to $\frac{5}{8}$ in. During lifting operations the reaction of the span was carried entirely by the center rib of the XLO joint which had been heavily reinforced with transverse girders and diaphragms in order to properly distribute the load throughout the joint. This center bearing had a clearance of $\frac{3}{8}$ in. between its upper and lower portions while the span rested. The upper bearing plate which was riveted to the bottom of the XLO joint was of nickel steel, $12\frac{1}{4}$ in. by $2\frac{5}{16}$ in. by 4 ft.



The Hanger Chains and Mooring Truss

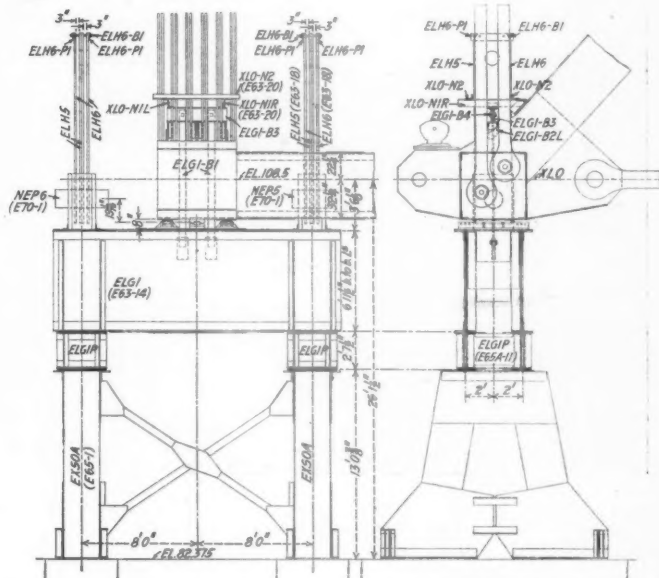
6⅜ in. and was slotted to a thickness of 1 15/16 in. to engage the nickel steel centering and bearing key, 5 in. by 2⅜ in. by 4 ft. 3 in. long. The upper surface of this bearing key was rounded transversely to a radius of 24 in. and bore against the flat planed surface of the upper shoe plate, giving a condition of bearing similar to that existing between a roller and its bearing plates. The lower shoe plate, 12½ in. by 4 1/16 in. and 5 ft. 8½ in. long, was of carbon steel and was slotted to a thickness of 3 5/16 in. in a similar manner to the upper bearing plate to engage the nickel steel bearing key. This key was held in place longitudinally during hoisting by the blocking plates. These plates were not in place while the span rested at Sillery. When the span floated the lower supporting girder dropped down ¾ in., the limit of clearance allowed by the small plate hangers. The loose ¾ in. bronze plate, and the 7/8 in. steel plate, were removed, allowing a clearance of 1¼ in. between the upper and lower portions of the outside bearings when the load of the span was taken on the center bearing after connecting up to the hoisting chains at the bridge site. This clearance was sufficient to take care of any rolling, due to lateral swaying of the span or inequality in jacking, of the lower supporting girder on the upper center bearing plate.

During hoisting the cast steel blocks of the outside bearings were reversed in position, blocking the upper portion of the bearing in the lower steel bed casting and preventing any transverse or longitudinal displacement of the lower supporting girder relative to the center of the XLO joint. Any longitudinal motion of the span while hoisting was taken care of by the pin connection of the hanger chains to the stubs of the lower supporting girder. The bearing on top of the CUO joint at the ends of the cantilever arms for the upper supporting girder, was practically identical with the center bearing of the XLO joint just described and acted in a similar manner in taking care of swaying motions of the suspended span during hoisting.

PREPARATIONS FOR FLOATING THE SPAN

The suspended span after it had been completely assembled and riveted up, rested on the end staging bents at LO and L18, the intermediate staging bents having been all removed. The scows which were used to float the span to the main bridge site, about three miles up the river, were floated into the positions under panel points L1, L2, L3, L15, L16 and L17, and as the tide lowered they came to a bearing on their concrete and timber beds. In the bottom of these scows valves were provided which were opened and were left open until the time of floating the span arrived, so that the scows and span would not be disturbed by the daily rise and fall of the tide.

The span was floated away from its erection site about one hour and a half before high tide, assisted by a westward current having a velocity of about five miles per hour, which



Support of the XLO Joint of the Suspended Span at End Bents LO and L18

carried the span towards the site of the main bridge. The span on its journey was controlled by six tugs of sufficient pulling capacity to produce a velocity of the span of four miles per hour against a 4-mile current and a 2-lb. wind. The time of arrival of the span at the main bridge site was controlled by these tugs so that the span came into position about one half hour after high tide, when for a period of about one hour the current does not exceed three miles per hour and during which period it changes direction with a consequent velocity of zero. The tugs held the span against the wind and current while the eight $1\frac{1}{4}$ in. steel mooring ropes, leading from the mooring trusses, were being connected to the snubbing posts bolted to the suspended span at the end panel points of the bottom chord.

These mooring ropes were calculated to take a pull of

75,000 lb. each and passed through sheaves at the lower corners of the mooring trusses and from there up to a nine-part $\frac{3}{4}$ in. wire rope tackle which led back to the drums of the derrick hoists situated on the bridge floor at the ends of the cantilever arms. The span was pulled directly under its final position in the bridge by means of these ropes and the derrick hoists. The hanger lifting chains which raised the span were then lowered two feet and connected through slotted holes at the lower ends to the pins at the top of the short hanger links connecting to the supporting girders.

The mooring frames were made of two steel trusses braced together by one vertical plane of laterals and three horizontal transverse brace frames. This bracing was designed to take a transverse pull from each end of the suspended span of 300,000 lb. The mooring frames were connected to the cantilever arm floorbeams so that they could be raised so as not to obstruct the channel unnecessarily.

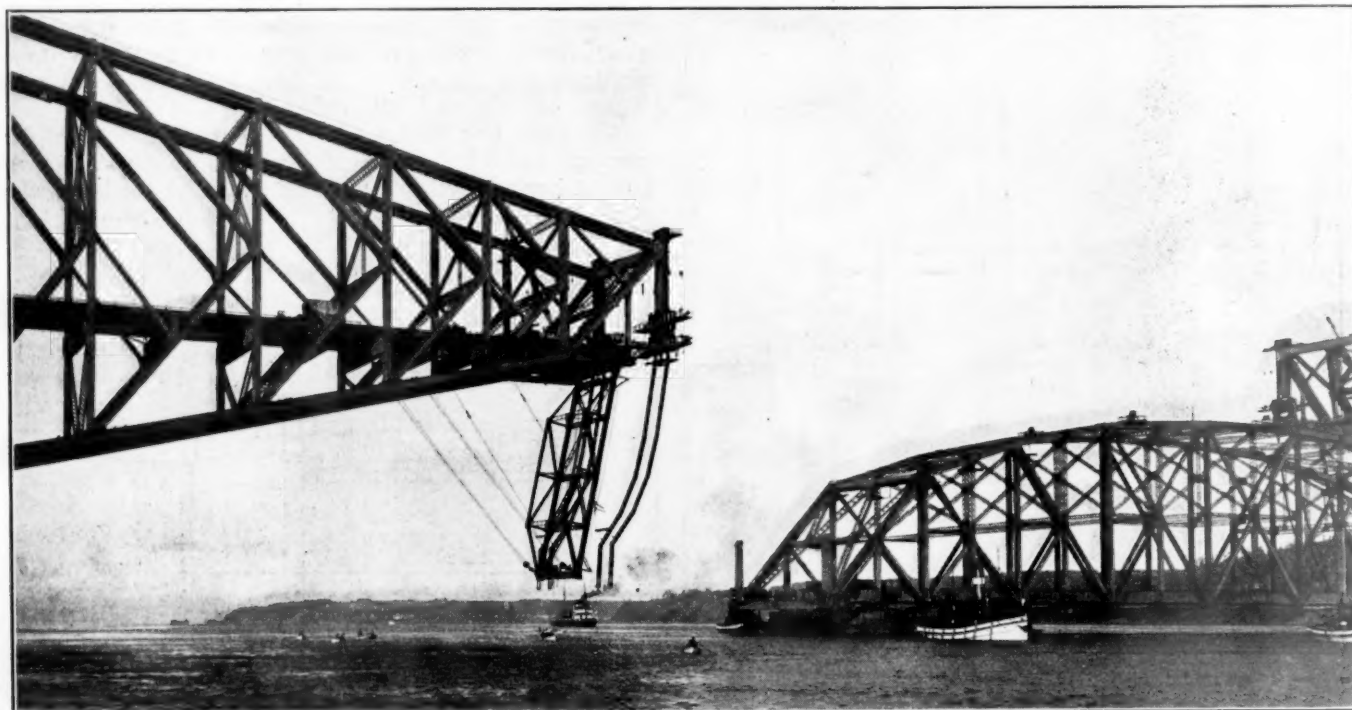
THE LIFTING APPARATUS

The lifting links or hanger chains were made of plates 28 in. wide, four plates to each chain and two chains to each corner of the span. These two hanger chains were

in. back to back of angles and 25 ft. long and were built up of two plate girders connected together by bearings, stiffening and pin connection diaphragms, and also cover plates.

The upper supporting girders at the CUO joint of the cantilever arm were designed in a similar manner to the lower supporting girders, the key bearing for the girders and the pin connections for the vertical hangers allowing turning about both the transverse and longitudinal axis of the supporting girders. With bearings of this design the suspended span could move in any direction under the influences of external forces arising from wind, pull of anchorage tackle or inequality in jacking during the hoisting of the span.

The jacking girders were located at the same elevation as the floor of the cantilever arm. They were hung from the upper supporting girders by stiff braced hangers which were pin connected at the upper and lower ends. At the lower ends these stiff hangers were attached to guides built of plates and angles which passed through the upper jacking girders and were riveted into the lower jacking girders. The position of the lower girders was therefore fixed and their distance from the panel point CUO did not change



The Span Arriving at the Bridge Site

attached to the lower supporting girder and were hung from the lower jacking girders, situated just above the bottom chords of the cantilever arms. The lower links of the chain were 31 in. wide instead of 28 in. to take the 15 in. pin connecting the chain to the stub of the lower supporting girder.

The material in all links was carbon steel except the two lower sections, which were silicon steel. These lower sections were made of silicon steel in order to provide a greater factor of safety against repeated bending stress due to swaying of the span under the action of wind and jacking forces. The bending stress in these links was higher and repeated more often than in the upper links of the chain. The links of the chain were connected together by 12 in. pins $12\frac{3}{4}$ in. long at each end and held in place by 14 in. dia. cast steel pin caps, threaded onto a $1\frac{3}{4}$ in. through pin bolt.

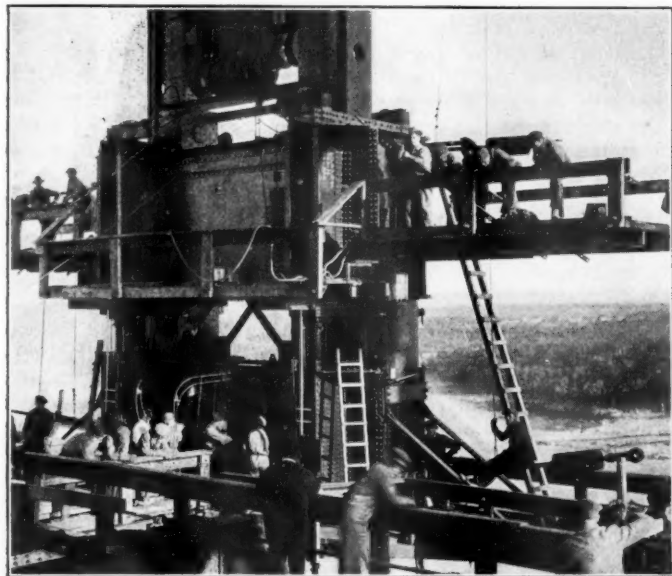
The hanger chains connected at the lower end to the supporting girders. These supporting girders were 6 ft. $11\frac{1}{2}$

during the jacking operations. The upper girders were the movable girders and slid up and down on the guides as the 1000-ton jacks were operated. These jacks were placed between the upper and lower jacking girders, two at each corner of the span, and did the work of lifting the span. In order to avoid binding of the jacks, due to the deflection of the jacking girders under load, the jacks were provided with rocker seats at their upper and lower bearings. They were located at the extreme end of the jacking girders where they bore against transverse diaphragms riveted into the jacking girders.

In addition to the hydraulic jacks, four follower-up screw jacks were provided at each corner of the span as a safety device in case anything should go wrong with the pumping system for the hydraulic jacks or the jacks themselves should fail to maintain the pressure necessary to hold the weight of the span while being lifted. These screw jacks also reacted against cross girder diaphragms in the upper and lower jacking girders. The screw itself was counter-

weighted so that practically all the friction due to its weight was eliminated. They were operated by hand from a platform in front of the lower jacking girder by means of a set of gearing so arranged that the two screws at each end of the girder were always at the same level. The counterweighting of the screws enabled the operator to turn them without difficulty and to follow the operation of the hydraulic jacks with equal speed and very little exertion.

The hanger lifting chains were guided between cross pin bearing diaphragms riveted into the jacking girders. The chains were bored every 6 ft. to receive a 12-in. dia. pin, while the cross diaphragms were bored for the same diameter of pin at 2 ft. centers. The clearance provided in the pin hole of the hanger chain was $\frac{1}{2}$ in. transversely and



The Jacking Girders Showing the Hydraulic Jacks and Safety Screws

$\frac{7}{8}$ in. longitudinally, and in the pin holes of the cross diaphragm 1 in. transversely and $1\frac{3}{4}$ in. longitudinally. This clearance was found to be ample to allow the pins to be driven without difficulty during jacking operations. Having the pin holes in the cross diaphragms at 2 ft. centers enabled the pin holes in the hangers to be bored at 6 ft. centers and at the same time accommodate the 2-ft. stroke of the jack.

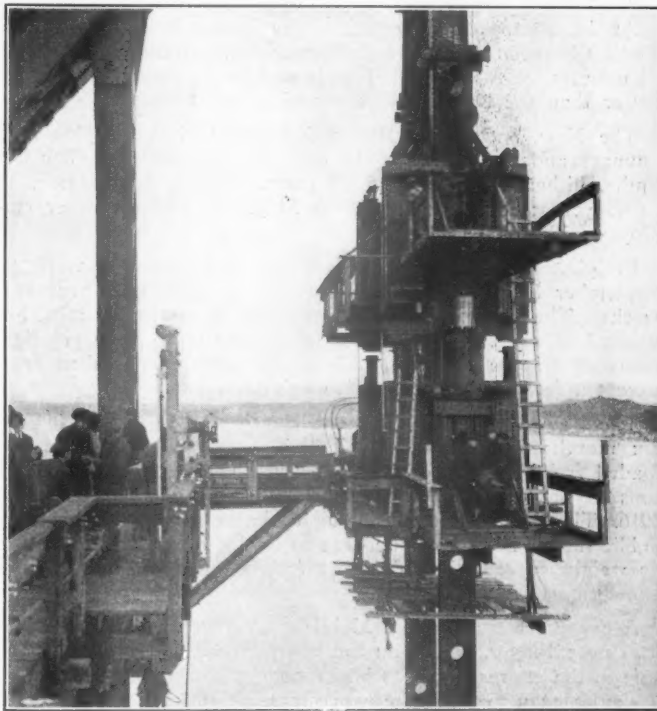
Each operation of the jacks lifted the span 2 ft. During the lifting or upward stroke a 12-in. pin engaged the hanger chains through the diaphragms in the upper jacking girders. At the finish of the stroke the pins were entered in the diaphragms of the lower jacking girders to engage the hanger chains. The upper pins were then removed, the pistons of the jacks and the upper girders lowered, the upper pins again entered, the lower pins removed, and the jacks again operated. As each 24-ft. length of hanger chain passed up through the upper jacking girders it was disconnected and removed. The jacking pins were counterweighted and balanced to enable them to be handled with facility by the men on the operating platform.

The jacks were supplied with water by a pair of direct acting double plunger pumps operated by compressed air and located on the center line of the bridge floor at the ends of the cantilever arms. By means of the set of controlling valves installed in front of the pumps the supply of water sent to each corner of the span was regulated and, in this manner with the aid of indicators placed in front of the valve operator which showed any difference in level between the lifting girders on each side of the bridge, the two corners of each end of the span were kept at the same elevation.

Another set of valves with similar indicators, situated on the operating platform in front of each set of jacking girders, controlled the water supply to each separate jack at one corner of the span.

RECORD OF FLOATING IN AND HOISTING OPERATIONS

The methods followed in floating were similar to those followed in last year's operations which were fully described in the *Railway Age Gazette* of September 22, 1916. The start was made at 5.45 on the morning of September 17, seven tugs being used in the operation. Ranges had been placed on the north shore at known distances apart so that the speed of the span could be ascertained at any time and increased or diminished as required to have the span arrive at the bridge site at the appointed time, when the current would be nearing zero velocity. The first jacking commenced at 9.10. Practically one complete operation was made before any load was taken by the lifting chains. Three more lifts were then made and the scows floated clear at 10.28. Twelve lifts were made during the first day and the span was hoisted a distance of 24 ft. Twenty-two lifts were made during the second day; twenty-six lifts during the third day, and fifteen lifts on the fourth day. The final connection between the eyebar suspenders at the ends of the span and those hanging down from the CUO joints of the cantilever arms, was made at 4.01 p. m. Sept. 20, 1917. At 4.51 p. m. of the same day, the load was transferred



End Elevation of the Jacking Equipment

from the lifting apparatus to the permanent hangers of the span.

The work was carried out under the supervision of the Board of Engineers, Quebec Bridge, composed of Messrs. C. N. Monsarrat (chairman and chief engineer), Ralph Modjeski and H. P. Borden. The St. Lawrence Bridge Company is the contractor for the superstructure, of which company Phelps Johnson is president, G. H. Duggan, chief engineer, Geo. F. Porter, engineer of construction, S. P. Mitchell, consulting engineer of erection, and W. B. Fortune, erection superintendent. The lifting apparatus which was furnished by the Watson Stillman Company of Aldene, N. J., performed its work with remarkable efficiency, no delays being experienced in the lifting.

General News Department

The Southern Railway has made a general increase, said to be 10 or 12 per cent, in the pay of clerks.

The Delaware & Hudson, beginning October 1, will run its passenger trains to and from the Canadian Pacific station in Montreal.

Large numbers of operators of the Great North Western Telegraph Company, of Canada, struck and left their work on Monday last.

The Delaware & Hudson has made a general increase in the pay of shopmen; said to be, for mechanics, from 45 cents an hour to 50 cents, and for helpers from 30 cents an hour to 33½ cents.

The State College of Pennsylvania announces special correspondence courses in elementary engineering subjects, established to meet the unusual demand for men in shops and manufacturing plants.

As the result of action taken by the Chicago committee of the Commission on Car Service on September 18, box cars unloaded in Chicago may be reloaded for movement over any railway in any direction, regardless of the ownership of the car.

At the Sheepshead Bay track, New York City, September 22, Louis Chevrolet, driving a Frontenac car, traveled 100 miles in 54 minutes 20.98 seconds. This is said to be about two minutes better than the best previous record for that distance.

The New York, New Haven & Hartford is to employ both younger and older men in the operating department. The age limits, hitherto, 21 years to 35 years, will be, for firemen, 18 to 45 years; for trainmen, 18 to 50 years; and for other employees, 18 to 60 years.

Freighthouse employees in Kansas City returned to work on September 24, after having been out on strike for over two weeks. The railroads granted increased wages to the men, but refused to recognize the union, which was one of the principal demands of the strikers. All of the men were taken back except a few of the most active agitators.

The New York, New Haven & Hartford reports that for the six months ending June, 1917, the average revenue tons per loaded freight car mile was 18.23 tons, as compared with 16.61 tons in the corresponding period last year, and 15.55 tons in 1916. The company is continuing to impress upon the shipping public that it is its patriotic duty to load cars to their full cubic or weight capacity in order that freight may be handled more expeditiously and efficiently.

A passenger train of the Mobile & Ohio was stopped by robbers near Finger, Tenn., on the night of September 20, and the safe in the express car was blown open. The robbers compelled the engineman to move the express car several miles away from the rest of the train; and after completing their robbery, which, it is said, gave them little of value, they drove the engineman and firemen off the engine, and, taking charge of it themselves, escaped by running some miles ahead.

The Tidewater & Western, a three-foot gage railroad, extending from Bermuda, Va., westward to Farmville, 89 miles, being unable to earn a living, proposes to dismantle and dispose of its property. Authority to do this has just been granted by the Supreme Court of Appeals of the state of Virginia, in a decision which annuls an order of the Corporation Commission of that state, which order held that the railroad company could not dissolve. The court sustains the opinion of Commissioner Rhea, who dissented from the order forbidding the railroad to suspend operations. It is understood that the rails are to be sold to go to England.

In a recent letter to officers and employees of the Chicago & North Western, R. H. Aishton, president, announces that all in the service of the road will be given an opportunity to subscribe to a fund to be used for the purchase of Christmas

presents consisting of tobacco, pipes, candy, etc., for shipment to the members of the North Western company of the Thirteenth Engineers (Railways) now in France. Contributions will be received by the division superintendents of the road, and no subscription will be accepted in excess of 50 cents from any one person. With these presents a list of subscribers will be sent to the officers in charge of the company.

Negotiations between the Northern Pacific and its telegraphers were at a standstill at the time of writing because of the delay of one of the vice-presidents of the union in reaching St. Paul to assist in the conferences. The original demand of the men was for an increase of 18.5 per cent in the wage scale, but this request has been modified to provide for a 15 per cent increase, to be distributed on the basis of a minimum advance of \$10 a month. The company offers an increase of 8.32 per cent, and maintains that the granting of that advance will make the average wage scale on the Northern Pacific equivalent to the scale granted by the Union Pacific to its telegraphers on July 1, and in excess of the wages paid on many other roads in Northern Pacific territory.

The Senate Committee on Interstate Commerce on September 21 began a hearing on the Pomerene bill, giving the President power to fix prices on steel, iron and their products, wherever and whenever sold, either by producer or dealer, and to establish rules for the regulation of the method of production, sale, shipment, distribution, apportionment or storage thereof among dealers and consumers, domestic and foreign. Thus the bill provides for the regulation of sales to the public as well as to the government, and to the Allies. Joseph E. Davies, of the Federal Trade Commission, was the principal witness at the first session, and testified that between 75 and 80 per cent of the bituminous coal in the country had been contracted for at prices in excess of the mine prices fixed by the President a few weeks ago. As the contracts made before the President's order are allowed to stand, this leaves only from 20 to 25 per cent of the supply to be affected by the reduced prices.

Charles A. Prouty, director of the division of valuation, of the Interstate Commerce Commission, has filed a memorandum in the Texas Midland case, stating that while the solicitor's brief covers the legal points involved, the law of valuation is in such a plastic state that the decision of the commission will go far toward fixing the law in many instances, and he therefore confines himself to what he calls the practical considerations involved. Director Prouty says that while he fully concurs in the holding of the solicitor that the valuation act does not require the commission to find an ultimate value, it is still his conviction that an ultimate value for rate-making purposes should be stated, and that the full benefit of this valuation cannot be realized unless this be done. However, he says, this does not mean that any sort of the work now being done, or of the money now being expended, is thrown away because the commission is not required to establish at this time such ultimate value; for the facts are being prepared to be reported to Congress under the present act and "a final value can be quickly stated when Congress has determined by whom and possibly by what rule such value shall be determined."

Aerial Mail Routes Proposed

As a result of a conference between the Postmaster General and the Secretary of War, and with the approval of the President, Congress has been asked to authorize the Secretary of War to turn over to the post office department all military airplanes and motor vehicles not serviceable for military purposes, or which after the war may be dispensed with for military service. As soon as authority of Congress is secured and any airplanes are turned over to the Post Office Department, it is proposed to establish airplane mail routes in this country similar to those in Italy and France. An amendment to authorize this plan has been added by the House Post Office Committee to the Senate

bill, authorizing experiments in motor truck delivery by the Post Office Department in the vicinity of large cities in the United States.

Three Miles Up with 12 Passengers

Lieutenant E. Resnati, an Italian army aviator now practicing in America, flying near Newport News, Va., on September 20, rose to an altitude of 17,000 ft., and he carried 12 passengers. The machine used was a Caproni triplane, propelled by three engines of 160 hp. each. It has a wing spread of 70 ft.

Headlight Order Modified

The Interstate Commerce Commission has announced a further modification of its locomotive inspection rules, postponing from July 1 to January 1, 1918, the effective date of the requirement that new locomotives shall be equipped with electric headlights, and providing that for locomotives in service prior to that date the changes shall be made the first time they are shopped for general repairs after that date. All locomotives are required to be equipped by July 1, 1920.

Wage Increases on Canadian Pacific

Increased wages and improved working conditions were recently granted to enginemen, firemen and hostlers on the western lines of the Canadian Pacific. Passenger enginemen and firemen received an increase of 40 cents and 25 cents per 100 miles respectively, or approximately 10 per cent on the minimum rate for passenger service. The minimum day's work in passenger service was fixed at 100 miles or less, or five hours or less, except on the Mountain sub-division, where 6 hours and 40 minutes or less, or 100 miles or less, will constitute a minimum day. Overtime will be allowed pro rata at 20 miles an hour for a five-hour day, and 15 miles an hour for a day of 6 hours and 40 minutes.

Freight enginemen and firemen were granted an increase of 25 cents and 15 cents per 100 miles respectively, and an eight-hour day. The increase will amount to approximately five per cent for a minimum day. Enginemen in yard service were granted a 5 cents a day increase, and firemen 5 to 15 cents a day, according to the class of engine, in addition to the eight-hour day. Enginemen and firemen in transfer service were granted an increase of 5 and 10 cents a day respectively, and an eight-hour day. Hostlers were granted the eight-hour day, with a minimum of \$3.20 and \$3.35 per day, according to the territory, and with overtime at 33¼ cents and 35 cents an hour respectively. All arbitraries (except the preparatory time) will be paid at rates per hour to conform with the eight-hour day. About 4,500 men are affected by the increases, which will total about \$450,000 yearly.

Old Times

J. E. Alger, a locomotive engineer, writing to the Springfield Republican, says that the Boston & Albany was the first American railroad to pay bonuses in lieu of pensions. He says:

"I have been much interested in your articles in regard to railroading, especially that entitled 'No More Pensions for Boston & Albany Railroaders.' I thought that an account of the first payment of any money made by a railroad to an employee for services rendered, outside of his regular wages, might be of interest.

"The road was the Boston & Albany, and the man James M. Alger, an engineer, running between Worcester and Boston. He retired May 1, 1895, after 49 years' service. I have before me the letter from E. D. Hayden, vice-president, containing the vote of the directors, giving to him, in recognition of his long and faithful services, the sum of \$1,200. Not long afterward another old engineer received the same amount. A little later, William Bliss, president of the road, made a ruling that any employee who had been in the service of the road for 25 years, with a clean record, and who wished to retire, should receive a check for a year's pay. This continued until the New York Central took control, and the new form of pension took effect.

"It is interesting to note the conditions of a half century ago. James M. Alger took the Brookline (suburban passenger) train in 1852; and December 25, 1856, the season ticket passengers made him a present of \$125. Mr. Alger took the 7 a. m. out of Worcester, March 7, 1864, and April 4, the following month, the

passengers on the Brookline train, that he left the month before, sent him a \$500 treasury note as a testimonial. Those were the days when the engineer knew almost every passenger who rode on his train. Now we know a few, but in the hustle and rush, there is no time for a handshake, and hardly for a word of greeting. . . ."

Turin to London, at 90 Miles an Hour

On Monday last, September 24, Captain Marquis Giulio Laureati, of the Italian air service, carrying one passenger, flew from Italy to England without a stop. He left Turin at 8:28, Italian time, and landed at Hounslow, a suburb of London, at 2:50 p. m., 656 miles in 7 hours 22 minutes, or an average rate of approximately 90 miles an hour. Captain Laureati flew an Aila machine, and carried two machine guns.

From Turin he followed the railroad as far as Susa, on the Italian frontier. Crossing the Alps (Mont Cenis) at an altitude of nearly 12,000 feet, he passed over Lanslebourg and followed the railroad from Modane. He passed to the east of Paris, and crossed the English Channel in 15 minutes. He carried an autograph letter from his King to King George. During the flight he took food from a bottle fastened inside his coat and fitted with a rubber tube like an infant's feeding bottle. On August 26 Laureati flew from Turin to Naples and back, a distance of 920 miles, without a stop.

Progress on Alaska Railroad

The deficiency appropriation bill passed by the House of Representatives on September 19, and then sent to the Senate, contains provision for an additional appropriation of \$4,000,000 for the construction of the Alaskan railroad. In connection with this item the following statement as to the progress of the road, up to September 10, by H. A. Meyer, assistant to the Secretary of the Interior, was placed in the Congressional Record:

"The Alaska Northern Railroad, purchased by the government and running from Seward to mile 71, at Kern Creek, is being rehabilitated. The first 25 miles from Seward are completed and able to handle any traffic. From mile 25 to mile 71 the road is being rehabilitated, but is usable. From mile 71 to Potter Creek, mile 100, a distance of 29 miles, extraordinarily heavy work is encountered requiring blasting through practically solid rock. Here the line runs along Turnagain Arm, and in this district the grading work has made some progress.

"Rail has been laid and the road is in operation southward from Anchorage, at mile 114, to mile 100, and northward to mile 175, with a branch at Matanuska, 38 miles from Anchorage, to Chickaloon, the heart of the Matanuska coal fields, a distance of 37 miles. It will thus be seen, with the exception of 29 miles of work along Turnagain Arm, rail has been laid from Seward to Chickaloon, a distance of 189 miles, and 23 miles additional on the main line. All efforts are now being made toward closing this gap. This it is hoped to do in 1918.

"Northward on the main line from mile 175 to mile 230 grading work is in progress and will be completed this season. Track laying here will proceed as rapidly as the weather will permit. From mile 230, Talkeetna, to mile 250, Dead Horse Hill, the grading is well advanced, but will not be finally completed until 1918. From mile 250 to mile 260 the right of way has been cleared. From mile 260 into and through Broad Pass, engineering and preliminary work has been done to mile 360. At mile 360 the Nenana coal field is reached, and from this point to the town of Nenana, at mile 415, 9 miles of track have been laid, 32 miles of grading have been practically completed, and 14 miles have been cleared and partially graded. From mile 415 to Fairbanks, at mile 470, the clearing has been completed and grading is underway.

"It will thus be seen that to date 192 miles of rail are in operation.

"With the additional funds requested it is the intention to lay rail along Turnagain Arm, and from Nenana southward to the Nenana coal fields. This work should be completed in 1918, and when this is done, there will be two units of operation, viz., from Seward into the Susitna Valley, with a branch to the Matanuska coal fields, which will permit of the shipment of Matanuska coal to tidewater at Anchorage and Seward, and from Fairbanks to the Nenana fields, so that shipments can also be made from the Nenana fields to the country tributary to Fairbanks."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JULY, 1917

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses			Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Maintenance of way and structures.	Equip-ment.	Trans- portation.					
Ann Arbor.....	293	\$207,367	\$52,356	\$259,723	\$15,411	\$31,406	\$6,726	63.67	\$101,333	\$13,100	\$88,233	\$24,468
Baltimore & Ohio.....	170	125,971	355,661	481,632	23,773	28,733	4,664	51.17	242,521	11,000	231,521	5,530
Baltimore & Potomac.....	4,937	9,226,443	1,732,416	10,958,859	1,450,413	2,028,443	4,962,214	280,837	3,082,786	357,054	2,725,732	-21,250
Central Vermont.....	31	314,498	325,734	640,232	28,007	36,212	1,290	67.73	105,096	13,897	91,198	10,930
Chicago, Indianapolis & Eastern.....	411	264,520	88,535	353,055	42,434	57,392	192,642	80.13	77,464	13,565	63,899	2,393
Chicago, Terre Haute & Southeastern.....	654	498,990	183,428	682,418	74,272	148,534	19,036	68.41	210,484	34,925	175,559	-39,012
Chicago & North Western.....	375	307,032	187,937	494,969	38,198	72,227	4,433	71.83	105,567	17,785	87,782	42,165
Coal & Coke.....	197	87,670	21,172	108,842	113,607	26,020	1,216	79.74	23,016	6,000	17,016	6
Detroit, Toledo & Ironton.....	441	196,684	13,352	210,036	229,011	33,007	3,685	91.78	18,832	8,000	10,832	-30,725
Duluth, South Shore & Atlantic.....	602	251,489	114,887	366,376	401,144	45,218	10,149	78.35	86,830	17,000	69,830	-31,963
Kansas City, Mexico & Orient.....	272	91,844	15,351	107,195	113,076	24,939	5,211	88.87	9,887	9,000	887	9,441
Kansas City, Mexico & Orient of Texas.....	465	74,454	17,315	91,769	90,039	13,763	3,855	104.33	4,165	5,000	-835	-20,180
Kansas City Southern.....	755	738,355	153,582	891,937	1,000,164	90,446	25,228	62.82	371,850	50,659	320,742	-27,836
Kansas City Terminal.....	23	.....	.....	.....	91,369	14,933	32,023	62.58	34,183	13,647	18,536	-5,931
Lehigh Valley.....	1,442	4,100,847	475,417	4,576,264	541,072	780,573	1,945,519	69.67	1,503,999	232,640	1,271,279	48,956
Minneapolis & St. Louis.....	1,646	699,793	168,260	868,053	152,432	89,504	372,148	70.65	271,463	46,378	225,085	-1,376
Oregon Short Line.....	2,306	1,732,125	531,989	2,264,114	310,538	269,623	621,731	55.23	1,06,225	169,410	936,638	22,390
Oregon-Washington R. R. & Nav. Co.....	2,052	1,175,910	486,259	1,662,169	279,017	200,285	44,357	67.15	595,816	100,600	495,174	52,640
Pere Marquette.....	2,248	1,235,065	441,943	1,676,998	232,508	245,392	745,045	69.66	577,088	56,048	521,029	-56,942
Philadelphia & Reading.....	1,127	4,647,475	687,636	5,335,111	317,682	1,121,710	59,078	68.39	1,799,498	179,262	1,620,184	-196,409
Pittsburgh, Cincinnati, Chic. & St. Louis.....	2,398	4,536,018	1,160,157	5,696,175	675,284	1,081,201	2,992,600	69.14	1,988,558	220,033	1,768,525	391,842
Pittsburgh, Shawmut & Northern.....	204	137,782	5,532	143,314	19,832	43,842	4,699	117.74	17,324	1,783	15,541	-38,698
Port Reading.....	21	.....	.....	.....	11,056	9,558	83,840	61.84	65,793	10,500	55,293	7,130
St. Louis, San Francisco & Texas.....	143	73,636	12,048	85,684	22,811	9,382	34,452	79.61	18,933	1,491	17,406	-4,827
San Antonio & Aransas Pass.....	732	227,578	91,341	318,919	340,737	54,689	7,213	89.02	37,423	15,000	22,406	-11,760
Staten Island Rapid Transit Co.....	23	51,812	85,872	137,684	15,017	11,488	63,421	95.72	63,908	9,000	54,908	396
Ulster & Delaware.....	128	43,286	60,074	103,360	-13,645	11,738	52,444	48.32	64,532	4,000	60,532	4,527
Alabama & Vicksburg.....	143	\$765,923	\$256,940	\$1,022,863	\$150,821	\$208,477	\$34,752	74.14	\$291,062	\$87,104	\$203,958	\$33,137
Alabama Great Southern.....	312	271,824	860,641	1,132,465	435,253	281,169	116,382	67.88	1,248,102	166,588	1,081,514	80,157
Ann Arbor.....	293	1,405,496	292,790	1,698,286	160,808	289,191	116,382	76.31	1,248,102	166,588	1,081,514	80,157
Arizona Eastern.....	378	2,123,559	369,449	2,493,008	304,646	245,035	18,891	47.79	1,396,215	143,720	1,252,495	387,833
Archison, Topeka & Santa Fe.....	8,645	55,862,570	17,016,411	72,878,981	7,889,003	13,222,229	24,510,729	62.38	29,680,684	4,411,247	25,269,437	2,577,922
Atlanta & West Point.....	93	466,866	337,216	804,082	102,170	166,162	47,323	73.15	249,318	51,368	197,950	49,406
Atlanta, Birmingham & Atlantic.....	640	1,721,538	331,508	2,053,046	313,157	362,744	109,855	83.84	358,917	95,900	263,017	53,179
Atlantic & St. Lawrence.....	167	773,798	156,487	930,285	282,018	217,488	765,894	127.29	-288,600	75,047	-363,648	-621,353
Atlantic City.....	170	655,956	959,432	1,615,388	178,825	161,004	24,137	74.68	430,216	76,000	354,124	16,649
Atlantic Coast Line.....	4,777	16,777,593	6,420,383	23,197,976	2,871,424	4,168,655	45,371,771	67.64	8,175,963	1,277,000	6,900,963	182,180
Baltimore & Ohio.....	4,601	57,260,989	9,826,572	67,087,561	8,143,930	14,126,064	1,370,796	67.64	17,529,408	2,438,399	15,091,009	170,660
Baltimore & Ohio Chicago Terminal.....	79	405,709	185,347	591,056	130,392	206,462	6,457	90.94	1,255	162,448	-160,982	-233,207
Baltimore, Chesapeake & Atlantic.....	87	405,709	185,347	591,056	130,392	206,462	6,457	90.94	1,255	162,448	-160,982	-233,207
Baltimore, Chesapeake & Atlantic.....	632	2,084,484	440,145	2,524,629	161,611	436,832	29,911	67.37	869,523	105,000	764,497	34,989
Bel. Ry. Co. of Chicago.....	31	1,165,172	.....	1,165,172	160,220	306,731	1,078,337	72.45	609,671	97,215	512,456	37,100
Bessemer & Lake Erie.....	205	607,637	201,133	808,770	681,561	1,693,143	79,603	71.04	1,859,105	215,211	1,643,894	-661,000
Bingham & Garfield.....	36	1,729,150	36,068	1,765,218	202,280	217,590	8,656	39.98	1,076,628	129,441	947,187	36,165
Birmingham Southern.....	44	478,943	13,921	492,864	110,221	167,128	5,667	95.61	29,149	19,070	10,079	-96,339
Boston & Maine.....	2,305	20,132,974	9,326,919	29,459,893	3,562,291	4,844,480	253,802	79.81	6,717,073	1,199,597	5,517,475	-2,884,932
Buffalo & Susquehanna R. R. Corp.....	252	916,869	42,560	959,429	155,204	272,577	12,354	81.60	179,769	33,250	146,518	-73,929
Buffalo, Rochester & Pittsburgh.....	586	7,151,893	721,954	7,873,847	799,895	2,149,020	112,601	79.41	1,679,702	215,000	1,464,657	-351,310
Canadian Pacific Lines in Maine.....	233	1,379,006	162,401	1,541,407	217,336	217,336	41,180	75.24	403,005	46,500	356,505	-116,775
Carolina, Clinchfield & Ohio.....	283	2,079,722	153,900	2,233,622	242,630	358,265	114,395	57.48	973,828	93,800	880,028	128,554
Carolina, Clinchfield & Ohio of S. C.....	17	107,481	9,066	116,547	12,006	7,738	17,965	52.53	57,399	4,200	53,199	7,435
Central of Georgia.....	1,918	5,536,541	2,067,615	7,604,156	1,258,551	1,514,264	280,801	72.67	2,328,438	444,306	1,884,132	313,045
Central New Jersey.....	684	15,514,448	3,764,757	19,279,205	1,718,619	2,994,323	208,115	68.38	6,584,411	1,109,362	5,475,049	-534,306
Central New England.....	301	2,789,150	205,260	3,000,410	314,351	535,232	8,040	63.17	1,571,854	131,400	1,026,257	-77,318
Central Vermont.....	411	1,705,652	512,319	2,217,971	231,125	383,869	53,649	60.23	1,811,697	102,523	1,709,174	-149,414
Charleston & Western Carolina.....	343	981,661	219,682	1,201,343	205,074	150,416	4,587,688	89.73	387,095	45,500	340,592	10,028
Chesapeake & Ohio Lines.....	2,379	24,298,034	4,062,423	28,360,457	3,331,994	6,274,448	409,401	70.99	8,839,057	1,061,913	7,777,144	-780,283
Chicago & Alton.....	1,053	8,168,912	2,534,533	10,703,445	1,177,411	2,214,015	275,958	70.42	3,404,601	378,516	3,026,085	529,874
Chicago & Eastern Illinois.....	1,131	9,016,757	1,871,878	10,888,635	1,336,515	2,940,680	191,261	71.40	2,561,719	218,900	2,342,819	476,203
Chicago & Erie.....	270	4,255,658	339,298	4,594,956	510,813	636,206	130,633	71.45	1,432,411	218,925	1,213,486	-397,775
Chicago & North Western.....	8,108	39,851,354	13,047,737	52,899,091	7,973,409	9,784,888	781,905	74.52	15,103,265	2,975,000	12,128,265	-1,392,771
Chicago, Burlington & Quincy.....	9,373	49,605,075	12,989,371	62,594,446	8,015,273	10,288,404	1,011,371	65.03	24,117,680	3,134,494	20,983,186	2,181,533
Chicago, Detroit & Can. Grand Trk. Jctn.....	60	748,485	97,806	846,291	74,265	113,957	13,575	86.92	104,596	24,822	79,774	-82,134
Chicago Great Western.....	1,496	3,658,889	2,018,662	5,677,551	921,298	1,560,881	320,477	76.55	2,160,221	372,000	1,788,221	-447,140
Chicago, Indianapolis & Eastern.....	654	3,577,875	1,141,618	4,719,493	449,308	897,130	138,126	68.72	1,607,414	238,174	1,369,240	35,078
Chicago Junction.....	13	44,136,483	11,348,282	55,484,765	219,755	173,317	8,759	87.97	224,894	21,430	203,464	-65,528
Chicago, Milwaukee & St. Paul.....	10,232	44,136,483	11,348,282	55,484,765	219,755	173,317	8,759	87.97	224,894	21,430	203,464	-65,528
Chicago, Peoria & St. Louis.....	255	991,480	157,231	1,148,711	1,031,461	109,066	1,196,152	72.95	16,894,736	3,417,925	13,476,811	-1,933,085
Chicago, Rock Island & Gulf.....	479	1,540,592	434,680	1,975,272	145,575	253,513	51,632	82.68	209,158	57,990	151,150	16,023
Chicago, Rock Island & Gulf.....	479	1,540,592	434,680	1,975,272	145,575	253,513	51,632	82.68	209,158	57,990	151,150	16,023

† Merged with B. & O. as of July 19, 1917.

Coal Production

The weekly report of the Geological Survey on the production of bituminous coal for the week ended September 8 shows 74.8 as the ratio of tonnage produced to full time capacity for the mines reporting, as compared with 72 for the preceding week. Coal originated by 17 of the principal bituminous carriers amounted to 111,874 cars, or 2,000 more cars than for any other week since July. The greatest increase was in Pennsylvania and Ohio, which, the report says, corroborates the inference drawn that the priority order on lake shipments is having its effect. Reports of cars loaded on 90 roads in the week ended September 15 show a gain of but .5 per cent over the week ended September 1. The improvement, the report says, is local and largely in the districts affected by the priority order. The percentage of full time output lost on account of car shortage by all mines reporting dropped from 10.3 to 6.5. Practically every district reporting exhibited a better car supply. The percentage lost on account of the labor shortage and strikes was 7.8, as compared with 6.9 in the preceding week.

Foreign Born Subscribers to the Liberty Loan

To ascertain the extent to which railroad employees of foreign birth subscribed to the first Liberty Loan, a special investigation has been completed on the directly operated lines of the Pennsylvania Railroad East of Pittsburgh and Erie. The result of this inquiry shows that out of a total of 160,127 employees, in all departments, 25,827 were born in foreign countries. There were among all the employees—both native and foreign born—52,782 subscriptions, totaling more than \$3,400,000.

Nearly one in three of the foreign-born employees was found to have been a Liberty Bond purchaser. The exact number of subscribers of alien birth was 8,146, or within two per cent of the proportion of employees of American birth who subscribed.

The inquiry also brought out the fact that there are in the service of the Pennsylvania Railroad men of 42 different nationalities, besides native-born Americans; and members of 30 alien races were included among the buyers of Liberty Bonds.

The Italian race furnished the largest number of foreign-born employees on the Pennsylvania Railroad, the number being 8,365, or practically one-third of all the alien born. Thirty-two per cent of the Italians, or a total of 2,725 employees, bought Liberty Bonds.

The inquiry also brought out the important fact that since the fall of 1914 the Pennsylvania Lines East of Pittsburgh have sustained a net loss of 7,977 employees of foreign birth, as a result of men returning to their native countries for military service, or obtaining employment elsewhere in America, attracted by the higher wages offered by industries which have been able to take advantage of economic conditions.

"Sailing" on Dry Land

The New York, New Haven & Hartford, in announcing its plan for sailing days for package freight, to be started on the first of October, explains the proposal as follows:

These sailing or shipping dates will be scheduled and regularly maintained. When a car, for example, is scheduled to leave a freight house on Wednesday afternoon at 3 o'clock for another designated point, that car will leave whether it is fully loaded or not. The shipper will know that his freight will leave that day; and he will know when the car is due at its destination, and he can advise the consignee accordingly.

This plan provides for direct shipments between various points, preventing the delay at transfer points where heretofore l. c. l. freight has been generally sent for reclassification. One of the principal causes of delay at the present time is the shortage of labor at freight houses, and the new plan will largely eliminate this. It is estimated that at least 1,200 less cars a week will be required to move the l. c. l. freight than under the old system.

Earlier closing hours will be established, and some cars will close as early as 12 o'clock noon, while others will close at 1 p. m., 2, 3 and 4. Shippers will be fully informed as to scheduled closing hours and shipping days, and printed schedules will be provided. The plan will be put into operation first in the larger cities on the eastern end of the line, Boston, Providence, Pawtucket, Woonsocket, Worcester, etc. Advance notice will be given shippers as to the time the new method will become effective.

The road has also adopted a suggestion of the Railroads' War Board that waybills accompany freight to prevent loss or delay of small shipments en route.

New York City Rapid Transit

The New York Public Service Commission, First district, reports that it is the hope of the commissioners to place the Lexington Avenue and the Seventh Avenue subways, New York City, in operation before the end of the year, and also to extend the operation of the Broadway subway from Fourteenth street north to Times Square. The completion of these lines will effect the greatest transit relief ever afforded to residents of Manhattan and the Bronx at any one time. It will mean the doubling (from four to eight tracks) of the subway facilities north of Forty-second street and their trebling, for most of the distance in Manhattan, south of Forty-second street. The Lexington Avenue and Seventh Avenue subways are to be operated by the Interborough Rapid Transit Company, and the Broadway subway by the New York Consolidated Railroad Company.

Automatic Stops on the San Francisco-Oakland

L. E. Jones, signal engineer of the San Francisco-Oakland Terminal Railways, in a paper presented before the Pacific Railway Club at San Francisco, August 9, reviewing the history of automatic signaling apparatus on high speed electric railways, says that the use of automatic train stops on that road has been so satisfactory during the six years since the first installation was made that the stops were introduced in connection with the interlocking signals of the company's principal terminal in 1916, when the tracks and signals were reconstructed. The stops were installed on about three miles of the line (double track) in 1910. Most of this line is on trestles in the bay, and heavy fogs are frequent. The terminal where the stops have been introduced is also on trestles, and derails, arranged in the ordinary way, cannot be used. Experience with the stops in this terminal for about one year has proved satisfactory, and at least one serious collision has been avoided by the automatic application of the brakes on a train of which the motorman had a mental lapse. He overlooked a signal when he was moving directly toward a heavily loaded passenger train at a speed of about 25 miles an hour.

These stops are described in the Signal Dictionary, page 113.

Society of Railway Financial Officers

The eleventh annual meeting of the Society of Railway Financial Officers will be held at the Jefferson hotel, St. Louis, Mo., on October 16, 17 and 18. The program includes an address of welcome by Richard S. Hawes, vice-president of the St. Louis Chamber of Commerce; an address by Frank Trumbull, chairman of the Railroad Executives' Advisory Committee, and a report on the Clearing House Committee, by T. H. B. McKnight, all on Tuesday; a paper on "Handling Liberty Loan Subscriptions," by R. W. Morrison, assistant treasurer, Pennsylvania Lines West; an address by John E. Lonsdale, president of the National Bank of Commerce of St. Louis, and vice-president of the National Association of Owners of Railroad Securities; a paper on "Pension Systems for Smaller Transportation Companies," by J. P. Reeves, treasurer, Chicago & Eastern Illinois; a paper on "Wartime Economies," by B. F. James, secretary and treasurer of the Colorado & Southern, and an address on "The Y. M. C. A. at the Front," by Rubens Humphrey, secretary, St. Louis Railroad Y. M. C. A., on Wednesday; and a paper on "Women for Treasury Department Work," by A. B. Jones, local treasurer of the Chicago & North Western, on Thursday.

Roadmasters Elect Officers

At the closing session of the convention of the Roadmasters' and Maintenance of Way Association at Chicago on Thursday morning of last week, the following officers were elected for the ensuing year: President, A. Grills, general roadmaster, Grand Trunk, St. Thomas, Ont.; first vice-president, J. B. Oatman, roadmaster, Buffalo, Rochester & Pittsburgh, Du Bois, Pa.; second vice-president, J. W. Powers, supervisor, New York Central, Oswego, N. Y.; secretary, P. J. McAndrews, roadmaster, Chicago & North Western, Sterling, Ill.; treasurer, Coleman

King, supervisor, Long Island, Jamaica, N. Y.; members of executive committee, four years, George Beckingham, superintendent of track, Grand Trunk, Montreal, Que.; J. P. Corcoran, roadmaster, Chicago & Alton, Bloomington, Ill.; three years, A. M. Clough, supervisor, New York Central, Batavia, N. Y.; W. Wiltsee, principal assistant engineer, Norfolk & Western, Roanoke, Va.; two years, J. S. McGuigan, roadmaster, St. Louis-San Francisco, St. Louis; one year, F. J. Meyer, roadmaster, New York, Ontario & Western, Walton, N. Y.

Chicago was selected as the place for holding the next convention, although the executive committee was given authority to change this location if conditions warranted.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of those associations which will meet during the next three months. The full list of meetings and conventions is published only in the first issue of the Railway Age Gazette for each month.

- AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.**—W. C. Hope, C. R. of N. J., 143 Liberty St., New York. Next meeting, October 16-17, St. Louis.
- AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.**—C. A. Lichty, C. & N. W., Chicago. Next convention, October 16-18, 1917, Chicago.
- AMERICAN SOCIETY OF CIVIL ENGINEERS.**—Chas. Warren Hunt, 220 W. 57th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 220 W. 57th St., New York.
- BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.**—Tom Lehon, The Lehon Company, Chicago. Meetings with American Railway Bridge and Building Association.
- CANADIAN RAILWAY CLUB.**—James Powell, Grand Trunk, P. O. Box 7, St. Lambert (near Montreal), Que. Regular meetings, 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal, Que.
- CANADIAN SOCIETY OF CIVIL ENGINEERS.**—Clement H. McLeod, 176 Mansfield St., Montreal, Que. Regular meetings, 1st Thursday in October, November, December, February, March and April. Annual meeting, January, Montreal.
- CAR FOREMEN'S ASSOCIATION OF CHICAGO.**—Aaron Kline, 841 Lawlor Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, Hotel La Salle, Chicago.
- CENTRAL RAILWAY CLUB.**—H. D. Vought, 95 Liberty St., New York. Regular meetings, 2d Friday in January, May, September and November. Annual dinner, 2d Thursday in March, Hotel Statler, Buffalo, N. Y.
- CINCINNATI RAILWAY CLUB.**—H. Boutet, Chief Interchange Inspector, Cincinnati, 101 Carew Bldg., Cincinnati. Regular meetings, 2d Tuesday, February, May, September and November, Hotel Sinton, Cincinnati.
- ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.**—Elmer K. Hiles, 568 Union Arcade Bldg., Pittsburgh, Pa. Regular meetings, 1st and 3d Tuesday, Pittsburgh, Pa.
- GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.**—A. M. Hunter, 321 Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3d Thursday in month, Room 1856, Transportation Bldg., Chicago.
- INVESTMENT BANKERS' ASSOCIATION OF AMERICA.**—Frederick R. Fenton, 11 W. Monroe St., Chicago. Annual convention, October 1-3, 1917, Baltimore, Md.
- MAINTENANCE OF WAY AND MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.**—F. W. Hager, Fort Worth & Denver City, Fort Worth, Tex. Next convention, October 16-18, 1917, Cleveland, Ohio.
- NATIONAL ASSOCIATION OF RAILWAY COMMISSIONERS.**—Jas. B. Walker, 120 Broadway, New York City. Next annual convention, October 16, 1917, Washington, D. C.
- NEW ENGLAND RAILROAD CLUB.**—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meeting, 2d Tuesday in month, except June, July, August and September, Boston.
- NEW YORK RAILROAD CLUB.**—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
- NIAGARA FRONTIER CAR MEN'S ASSOCIATION.**—Geo. A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Meetings, 3d Wednesday in month, New York Telephone Bldg., Buffalo, N. Y.
- PACIFIC RAILWAY CLUB.**—W. S. Wollner, Assistant to Chief Engineer, Northwestern Pacific R. R., San Francisco, Cal.
- PEORIA ASSOCIATION OF RAILROAD OFFICERS.**—F. C. Stewart, 410 Masonic Temple Bldg., Peoria, Ill. Regular meetings, 3d Thursday in month, Jefferson Hotel, Peoria.
- RAILWAY CLUB OF PITTSBURGH.**—J. B. Anderson, Room 207, P. R. R. Sta., Pittsburgh, Pa. Regular meetings, 4th Friday in month, except June, July and August, Pittsburgh Commercial Club Rooms, Colonial Annex Hotel, Pittsburgh.
- RAILWAY FIRE PROTECTION ASSOCIATION.**—C. B. Edwards, office of the president's assistant, Seaboard Air Line, Norfolk, Va. Next meeting, October 2-4, 1917, Planters Hotel, St. Louis, Mo.
- RICHMOND RAILROAD CLUB.**—F. O. Robinson, C. & O., Richmond, Va. Regular meetings, 2d Monday in month, except June, July and August.
- ST. LOUIS RAILWAY CLUB.**—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August, St. Louis.
- SOCIETY OF RAILWAY FINANCIAL OFFICERS.**—L. W. Cox, N. & W., Philadelphia, Pa. Next annual convention, October 16-18, St. Louis, Mo.
- SOUTHERN & SOUTHWESTERN RAILWAY CLUB.**—A. J. Merrill, Grand Bldg., Atlanta, Ga. Regular meetings, 3d Thursday, January, March, May, July, September, November, 10 a. m., Piedmont Hotel, Atlanta.
- TRAFFIC CLUB OF CHICAGO.**—C. B. Signer, La Salle Hotel, Chicago.
- TRAFFIC CLUB OF NEW YORK.**—C. A. Swope, 291 Broadway, New York. Regular meetings, last Tuesday in month, except June, July and August, Waldorf-Astoria Hotel, New York.
- WESTERN CANADA RAILWAY CLUB.**—L. Kon, Immigration Agent, Grand Trunk Pacific, Winnipeg, Man. Regular meetings, 2d Monday, except June, July and August, Winnipeg.
- WESTERN RAILWAY CLUB.**—J. W. Taylor, 1112 Karpen Bldg., Chicago. Regular meetings, 3d Monday in month, except June, July and August, Hotel Sherman, Chicago.
- WESTERN SOCIETY OF ENGINEERS.**—Edgar S. Nethercut, Acting Secretary, 1735 Monadnock Block, Chicago, Ill. Regular meeting, first Monday in month, except January, July and August. Extra meetings generally on other Monday evenings except in July and August.

Traffic News

A hearing before the Interstate Commerce Commission on claims for loss or damage of grain was resumed at Chicago, Ill., on September 18, before H. C. Wilson, attorney examiner.

The Montana Railroad and Public Service Commission, in a decision announced on September 14, denied the application of the railroads of that state for an increase of 15 cents a ton in coal rates.

The Baltimore & Ohio has filed with the Interstate Commerce Commission a tariff providing that coupons of mileage books may be used by passengers for the payment of excess baggage charges, and for meals in dining cars, and telegrams.

In passing the deficiency appropriation bill on September 26 the Senate increased the appropriation for the transportation of the army and its supplies from \$350,000,000, as provided in the House bill, to \$413,567,777. The bill was then sent to conference.

The Southern Classification Committee has announced an extensive docket of proposed changes to be made in Southern Classification No. 43, on which shippers will be given an opportunity to be heard at a hearing at the Sinton hotel, Cincinnati, beginning on October 9.

The New York State Public Service Commission, Second district, announces that substantially all intrastate freight rates west of Buffalo and Salamanca have been advanced to the basis provided for in the orders of the Interstate Commerce Commission, increasing interstate rates on the 15 per cent application of the railroads.

The Baltimore & Ohio has accepted no freight for Baltimore, except foodstuffs and the other articles usually excepted, since September 21, whether carload or less than carload; and on Tuesday of this week it was said that 1,500 cars were still waiting. There is a shortage of men to unload the cars, and consignees have been slow in unloading bulk freight.

The Southern Pacific reports deciduous fruit shipments from California, from last November up to August 27, as totaling 9,903 carloads, the largest movement in history. As compared with previous years the records read: For 1914, 8,044 cars; for 1915, 7,242; for 1916, 9,556; for 1917, 9,903. The grape movement is now on and a recent estimate placed the grape movement from California this year at 11,000 cars.

During the period extending from the opening of the Panama Canal for commercial traffic in August, 1914, to the end of June, 1917, 3,751 vessels with cargoes aggregating 15,339,000 tons passed through it. The traffic from the Pacific ocean to the Atlantic was considerably heavier than that in the other direction; 1,905 vessels with a cargo tonnage of 8,702,300, making the trip from the Pacific to the Atlantic, and 1,846 ships with a cargo tonnage of 6,636,800, making the trip through the canal to the Pacific. Nearly one-half of this total traffic was handled in the year ending June 30, 1917.

The Missouri Public Service Commission has issued an appeal to shippers and carriers asking for the utmost conservation of the car supply. It says: Buyers should order by maximum car loads instead of customary trade units; should place their orders in advance as far as possible so that shippers may be able to double load the cars; should promptly unload all freight, and not take advantage of the full free time granted. Shippers should order only the cars actually needed, and should specify the smallest size cars necessary to carry the loads. Shipments to the same destination should be combined in one car as often as possible.

The Kansas Public Utilities Commission on September 17 filed a formal answer in the United States District Court at Topeka, Kan., to the charges of the carriers relative to the two-cent passenger fare law in force in that state. On August 24, the

Atchison, Topeka & Santa Fe and other railroads applied for an injunction to prevent the utilities commission from interfering with the filing of higher rates, setting up that the Kansas two-cent fare law of 1911 was confiscatory and discriminatory against interstate traffic. The testimony of the Santa Fe, which was typical, showed that the road earned only 1.96 per cent on Kansas passenger business in 1916.

In order to facilitate the direction and proper ticketing of passengers to the military and naval posts throughout the country, the passenger traffic department of the Illinois Central has prepared a bulletin containing essential information concerning military posts located on that road and in adjacent territory served by its immediate connections, a map showing the location of the military posts, and a list of all other encampments. With reference to the encampments on or near the Illinois Central, the bulletin contains information relative to the character of each camp, its location, also the fare from large cities in the vicinity, and directions concerning the routing of passengers.

Reports received by R. H. Aishton, president of the Chicago & North Western, and chairman of the Central Department Committee of the Railroads' War Board, show that from the beginning of the war up to September 22, passenger train service in the 15 states in the department has been reduced to the extent of 9,201,327 train-miles per year. Through the reductions so far made in the central department, 1,660 men and 320 locomotives have been made available for other service, and there is an annual saving of 989,399 tons of coal, and 203,097 barrels of fuel oil. In most cases where a train has been annulled additional coaches have been added to other trains. In some cases mixed trains are doing the service which had been given by regular passenger trains. No transcontinental trains have been taken off.

The Japan Travel Association has recently organized for the purpose of promoting and stimulating interest in trade and travel between Japan and America and to disseminate information to that end through the co-operation of railway and steamship agencies in all parts of America and the Orient. The association will publish a monthly periodical, entitled "Japan," which will be distributed free to all important ticket agencies in the United States. The officers of the association are: President, George H. Corse, Jr., foreign passenger agent of the Union Pacific System, Chicago; vice-president, L. H. Nutting, general eastern agent, Southern Pacific, New York; treasurer, L. E. Bemiss, agent, Toyo Kisen Kaisha, San Francisco, Cal.; and secretary, James K. Steele, editor of "Japan," San Francisco, Cal.

The oppressively hot weather of late July incited travel to mountain, lake and ocean resorts. Hotels and transportation companies have made up in part in August for slender earnings in the early summer, but the short summer resort season comes to an abrupt close at Labor Day. There seems to be no good reason for the tradition that Labor Day must mark the close of vacation activities. September and October furnish the most equable and agreeable weather in our latitude. A well organized effort to establish a new tradition by exploiting the advantages of early fall travel and resort enjoyments, would doubtless bring good returns. The National parks and other Western resorts seem to have fared better than the Eastern. Estes park has had capacity business, and while Yosemite and Yellowstone have had smaller patronage than last season, Glacier National park has had a substantial increase. Commercial travel continues very heavy.—*American Express Bulletin*.

Every hog that is killed in transit, due to overcrowding or mis-handling, means a loss now of about \$30, and the Department of Agriculture advises the following simple precautions: 1. When hogs are very hot, during or after a drive, never pour cold water over their backs. 2. Before loading, clean the car and bed it with sand, which during dry, hot weather should be wetted down thoroughly in the daytime. In hot weather it is advisable to suspend burlap sacks of ice from the ceiling of the car to reduce the temperature, and, incidentally, to sprinkle the animals with cool water. Ice placed in sacks on the floor is not accessible to all the hogs. 3. Crowding hogs in a car during warm weather is a prolific source of mortality. 4. The feeding of corn before and during shipment in hot weather should be reduced to a minimum. Oats are preferable. The maximum

maintenance requirement of hogs in transit for 24 hours is one pound of grain a hundredweight or approximately three bushels of corn to a car. Thousands of bushels of corn have been wasted in live-stock cars.

The Reconsignment Waste

The Bureau of Markets of the United States Department of Agriculture, reporting on an inspection of the Potomac Yards (Alexandria), Virginia, for 30 days last summer, reports that 236 cars of perishable commodities were held on the average of 44 hours each by shippers or consignees, before issuing orders to move the cars. No car held for less than 24 hours was counted. A car of cabbage was held 78 hours; a car of water-melons, 84 hours; a car of cucumbers, 104 hours; a car of potatoes, 128 hours; and a car of tomatoes, 213 hours.

Shippers to Give Active Assistance to Chicago Committee

At the meeting of the executive committee of the Chicago committee of the Chicago Commission on Car Service on September 10, the names of those who have been selected to represent the National Industrial Traffic League and the Chicago Association of Commerce on various sub-committees were announced. F. T. Bentley, traffic manager of the Illinois Steel Company, will represent the National Industrial Traffic League, and H. C. Barlow, traffic director of the Chicago Association of Commerce, will represent his organization on a committee on accumulation and embargoes. This body will have power to place embargoes when necessary to prevent the loading and delivery of cars to industries or individuals failing to unload cars within a reasonable time. This committee will be assisted by a committee on the delays in loading and unloading cars of which W. J. Womer, traffic manager of the Consumers' Company, Chicago, is a member representing the National Industrial Traffic League. In addition, R. C. Ross, traffic manager of J. T. Ryerson & Son, Chicago, will represent the league, and George W. Dixon, president of the Arthur Dixon Transfer Company, the Chicago Association of Commerce, on a committee on handling l. c. l. matters and trap cars. F. L. Bateman, secretary of the Chicago Furniture Manufacturers' Association, will represent the league on a committee on intensive loading.

The executive committee also discussed the question of the grain movement this year as compared with last, and in this connection it was stated that shipments of wheat and oats were exceedingly light, and it was thought that possibly a large part of the wheat crop would be milled and shipped out as flour. It was also the consensus of opinion that the greater part of the wheat that is exported this year will be shipped from the gulf ports, thus relieving to a large extent the congestion at the terminals on the Atlantic seaboard. A letter was read from J. S. Brown, manager of the transportation department of the Chicago Board of Trade, who advised that the only Chicago roads apparently in need of cars for the grain movement were the Chicago & Alton, the Chicago & Eastern Illinois, the Illinois Central and the Wabash. J. F. Porterfield, general superintendent of transportation of the Illinois Central, stated on September 10 his road was short 665 cars for grain loading at Indiana and Illinois points. He also stated that the I. C. received an average of 130 cars for grain loading per day last year, whereas they were getting only about 30 per day from eastern roads this year, and that help would have to be given by the Commission on Car Service if the movement of grain was to be taken care of on his line. The matter was referred to the Commission on Car Service at Washington, with the request that it consider the advisability of ordering cars to Illinois and Indiana territory.

In response to an inquiry by the Commission on Car Service at Washington as to the attitude of the Chicago roads towards the acceptance or rejection of bad order cars on the commission's orders, it was the consensus of opinion that the following resolution passed by the General Superintendents' Association of Chicago was to the point: "Resolved, that all cars offered on equalization orders of the Commission on Car Service shall be cars which, when delivered, are at least suitable for rough freight of some character. The receiving line should accept and make repairs to all cars requiring running repairs."

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The Interstate Commerce Commission has suspended from September 20 until January 18 the proposed increase in rates on petroleum and its products between points in Central Freight Association territory.

The Interstate Commerce Commission has approved for filing tariffs filed by the Toledo & Ohio Central and the New York Central increasing from 5 to 6 cents per net ton the charge for transferring lake cargo coal to vessel at lake ports.

The commission has suspended from September 20 until January 18 proposed increased commodity rates on cigars, cigarettes and tobacco from Durham, Raleigh and other points in North Carolina and certain Virginia points to points in Central Freight Association territory.

The commission has suspended from September 20 until January 18 tariffs providing for increased rates on wooden pails and tubs in straight or mixed carloads between points on the lines of the Great Northern, Minneapolis, St. Paul & Sault Ste. Marie and the Northern Pacific.

The Interstate Commerce Commission has suspended from September 20 until January 18 proposed increased carload commodity rates on cypress lumber from certain stations on the Chicago, Rock Island & Pacific in Arkansas to Kansas City, Omaha and other western destinations.

Briefs have been filed with the Interstate Commerce Commission in the case involving the tentative valuation of the Texas Midland, reported by the Division of Valuation, which was protested by the road. Briefs were filed in behalf of the railroad company, pointing out the objections to the tentative valuation; by P. J. Farrell, solicitor for the Division of Valuation, asking that the tentative report be made final; by the valuation committee of the National Association of Railway Commissioners, approving the tentative valuation with some modifications, but urging an estimate as to the original cost to date, and on behalf of the four brotherhoods of train service employees, contending that the tentative report should be referred back to the Division of Valuation for a finding as to the original cost to date, without which, it was argued, the report would be valueless, Solicitor Farrell in his brief contended that the commission is not required by the law to fix a definite value.

STATE COMMISSIONS

The Denver, Laramie & Northern

The Public Utilities Commission of Colorado, in a decision issued September 1, approves the action of the Denver, Laramie & Northern in abandoning a part of its road; but concerning the central portion, about 29 miles, the proposed abandonment and dismantling is disapproved. It is understood that this part is to be sold to the Great Western Railway, which operates a line from Longmont to Eaton.

The Denver, Laramie & Northern, formerly the Denver, Laramie & Northwestern, operates from Denver, northward, 56 miles, to Greeley, the stations referred to, in order, being: Utah Junction, 3 miles; Boulder Valley Junction, 19 miles; Milliken, 43 miles; Elm, 48 miles; Greeley, 56 miles. From Denver to Utah Junction, the trains are run over the line of the Denver & Salt Lake; and entrance into Greeley is over the tracks of the Greeley Terminal Railway. The commission holds that there is no demand for the service of this road, warranting maintenance of train service, between Elm and Greeley and between Utah Junction and Boulder Valley Junction. From Boulder Valley Junction to Elm the line is to be taken over by the Great Western.

The decision quotes at length the opinions of numerous courts and state railroad commissions concerning the powers of state commissions in cases of this kind, and also concerning the right of a railroad to give up or transfer its franchise authorizing it to

exist as a corporation. The whole of this line, both that part which is sold to the Great Western and the parts which are to be abandoned, is paralleled by the Denver-Cheyenne line of the Union Pacific, and parts of the line are also paralleled by other roads.

Colorado Car Repairers—Sheds Refused

The Public Utilities Commission of Colorado, George T. Bradley, M. H. Aylesworth and A. P. Anderson, reporting on a complaint of the Brotherhood of Railway Carmen against all of the railroads of Colorado, dismisses the request of the carmen that the commission order the railroads to erect sheds for the protection of car repairers from the weather. Quoting President Wilson (in his proclamation of April 16), and the circular of the Railroads' War Board, calling on railroad men and all other citizens to put forth their utmost efforts to win the war, and to avoid unnecessary work and expenditures, the commission holds that it would be unreasonable to issue the order for the erection of the sheds at the present time. It is recognized that there may be a few days in the winter when sheds would promote the convenience of the men, but the urgency is held to be not so great as claimed.

COURT NEWS

Stop, Look, Listen Rule—Idaho

The Idaho Supreme Court holds that it is the duty of one about to cross a railroad track at a crossing to look and listen, but that it is not negligence per se to fail to stop; and that where the facts are disputed, the question of contributory negligence is one of fact, to be determined by the jury, under proper instructions.—*Graves v. Northern Pacific (Idaho)*, 166 Pac., 571. Decided June 29, 1917.

Constant Operation of Crane at Terminal Not a Nuisance

A crane used by a railroad company for loading and unloading freight was situated in a district in Detroit, the character of which was not preponderantly residential. In a suit against the company the Michigan Supreme Court holds that the operation of the crane by day and night, where made necessary by the demands of the public, was not a "public nuisance." The locality was clearly a railroad terminal, and its character as such must have been known to the people now living there when they took up their abode there. It was held that the trial judge should have directed a verdict for the railroad company and judgment of conviction was reversed.—*People v. Wabash (Mich.)*, 163 N. W., 396. Decided July 26, 1917.

Termination of Initial Carriers' Liability—Custom

Bills of lading of a shipment of cattle provided for through transportation from points in Alabama to New Orleans, La. They contained no stipulations as to point or mode of delivery after arrival at New Orleans. The initial carrier, the Atlantic Coast Line, delivered the cattle to the L. & N. at Montgomery, Ala., by which road they were carried to the terminus at New Orleans. The consignee received two cars of cattle at the L. & N. pens, while all the others were delivered over the Louisiana Southern to an adjacent parish, where the consignee had its yards and place of business. By custom or course of dealings between the consignee and the L. & N., the consignee had the option of receiving shipments at the L. & N. stockyards or through an intermediate carrier. In an action for damages by the shipper against the A. C. L., the Alabama Supreme Court holds that the defendant's liability ended when the shipment arrived at the terminal of the L. & N. for delivery, and as the shipper failed to prove that the condition of the cattle was produced by the defendant or the L. & N., the trial court properly directed a verdict for the defendant. The liability of the defendant could not be extended to cover any loss or damage to the cattle while being transported over the line of the Louisiana Southern by any custom or course of dealings between the consignee and the L. & N., especially where the defendant, when he accepted the shipment, knew nothing of such custom or course of dealing.—*Henderson v. A. C. L. (Ala.)*, 76 So., 309. Decided July 2, 1917.

Foreign Shipments—Limitation of Liability

The New York Appellate Division holds that a shipment from Yokohama to New York, in respect to its transportation by rail from San Francisco, the shipper having given no notice that he elected to ship subject to the common law rules of liability, must be deemed to have been made under the filed classifications and rates, and under the terms of the uniform bill of lading, though no such bill was in fact issued or signed. Under the third section of the uniform bill of lading on file with the Interstate Commerce Commission, where a lower than invoice value of the goods was agreed upon by the bill of lading issued by a steamship company covering a shipment from Yokohama to New York, a carrier by rail, for loss of the goods, was liable only for the agreed value, the agreement having been made for the benefit of each successive carrier.—*Burke v. Union Pac.*, 166 N. Y. Supp., 100. Decided July 13, 1917.

Relief Department Contract—Release in Full

A South Carolina statute provides that the acceptance of benefits under a relief department contract shall not bar an action for negligent injury, notwithstanding a subsequent release given on payment of such sum only as may be due the employee under contract. An employee was injured while employed by the Atlantic Coast Line and while he was a member of its relief department. A dispute existed as to the amount due him on the relief contract, and he refused to accept an amount tendered, and brought suit for damages for his injury. A compromise was effected whereby he was paid \$3,500, which he accepted, executing a release, "in full payment by way of settlement and compromise of all claims and damages growing out of or incident to the injury received by me." He subsequently sued on the relief department contract and the railroad pleaded the release as a bar. The South Carolina Supreme Court holds that the release was a bar to a suit on the relief contract and affirmed judgment for the defendant.—*Starr v. A. C. L.* (S. Car.), 93 S. E., 176. Decided July 25, 1917.

Signal Structure Not an "Attractive Nuisance"

A railroad had recently set up a metal signal structure, including a railed platform at the height of 20 feet, reached by a permanent ladder with rungs that began one foot from the ground and were one foot apart. Near the structure was a wooden pole that for some time had been used by another railroad. Cross-arms on that pole supported dangerous high voltage electric wires. The wires were 3 feet or more above the rail of the platform. A boy between 11 and 12 years old climbed up the ladder to the platform, and while waving his arms in gesticulation came in contact with one of the wires, and was severely injured. He sued the railroad. There was proof that sometimes children had played near the structure, which was on the defendant's right of way in Connecticut, and that they had on occasions climbed the structure. There was no proof that the defendant affirmatively had countenanced or permitted, or knowingly had suffered such play or such ascents. The plaintiff claimed that by the law of Connecticut the railroad was liable for negligence. The New York Court of Appeals held that the proof did not justify a verdict for the plaintiff. The plaintiff assumed all risk of danger incident to the then condition of the premises. The so-called "attractive nuisance" doctrine has never been sanctioned by the Connecticut Supreme Court, and the leading New York case on the subject, *Walsh v. Fitchburg*, 145 N. Y. 301, is to the same effect. In both Connecticut and New York the rule is that the duty of a railroad company toward a boy who has become a licensee is not greater than its duty would be to him as a trespasser. No distinction is made between mere trespassers and bare licensees. The railroad was entitled to an instruction that the jury could not predicate a verdict on the proposition that the signal structure was an attractive nuisance; and it was error to qualify such instruction with the statement that the jury might "consider the way this was built in deciding whether the defendant should reasonably have anticipated the boy's climbing the pole." The burden was on the plaintiff to establish active negligence by the defendant. Judgment for the plaintiff was reversed and a new trial granted.—*St. Cartier v. New York, N. H. & H.*, 165 N. Y. Supp., 852.

Equipment and Supplies**FREIGHT CARS**

THE WESTERN MARYLAND is asking prices on 1,000 freight cars.

THE GREAT LAKES TRAINING STATION, Great Lakes, Ill., is inquiring for 8 gondola cars.

THE MICHIGAN ALKALI COMPANY, Detroit, Mich., is inquiring for 50 50-ton to 70-ton hopper cars.

THE CUBA NORTHERN has ordered 25 30-ton steel underframe flat cars from the American Car & Foundry Company.

THE OHIO CITIES GAS COMPANY, Columbus, Ohio, is inquiring for 50 to 100 8,000-gal. tank cars.

THE UNITED STATES NAVY has ordered 3 flat cars from the Central Locomotive & Car Works for the Portsmouth, N. H., navy yard.

PASSENGER CARS

THE GUANTANAMO & WESTERN (Cuba) is inquiring through Carr Brothers, of New York, for 3 first-class coaches, 6 third-class coaches, and 3 combination baggage and mail cars.

THE CUBA NORTHERN has ordered 6 first class coaches, 10 second class coaches and 4 combination baggage mail and express car from the American Car & Foundry Company.

IRON AND STEEL

THE RAY & GILA VALLEY has ordered 156 tons of steel from the American Bridge Company for a bridge near Ray, Ariz.

THE VALUE OF MECHANICAL ENGINEERING.—Nowadays most of the civil engineer's work is done by machinery, and even the architect is rapidly becoming only an adjunct to the constructional engineer. The mechanical engineer is called in at the inception of every big undertaking, whether civil or military; and those not thoroughly grounded in mechanics have to take a back seat.—*Railway Gazette, London.*

THE UGANDA RAILWAY, AFRICA.—The railway and lake steamer facilities in the Protectorates of British East Africa and Uganda are owned and operated by the government through the management of the Uganda Railway. The lines operated are all of meter gage. The Uganda Railway proper from Mombasa to Kisumu, on Lake Victoria Nyanza, has a total mileage of 618. The rolling stock consists of 97 locomotives, 234 passenger cars, and 1,292 small freight cars, mostly steel. In Uganda the Busoga Railway has 61 miles of track, and the Port Bell-Kampala Railway operates 6 miles.

LINKING RAILWAYS IN SOUTH AMERICA.—An interesting development in the scheme for linking up the South American railways has just been completed. For some years past the Antofagasta (Chile) & Bolivia Railway and the Bolivia Railway have been constructing new railway lines in Bolivia under a concession given by the Bolivian government in 1906 to certain American bankers. More than \$30,000,000 have already been expended on this scheme, \$12,500,000 of which has been provided by Bolivia. Lines have been constructed linking up the Antofagasta system with the Bolivian capital, La Paz, with Potosi, a mining center, and Cochobambo, an important agricultural district. In addition, a line has been built to tap extensive mines in the south of Bolivia, and this line, it is intended, will eventually connect Bolivia with Argentina. The railway program was initiated by General Montes, the ex-president of Bolivia, who opened the Cochobambo line last month. Percival Farquhar, who conceived the Brazil Railway scheme, was interested in this project, and acquired a large holding in the Antofagasta Company, a substantial portion of which, however, had to be sold subsequently, owing to the Brazil company's difficulties.

Supply Trade News

Russell Dale, general sales manager of the Rich Tool Company and manager of the Tungsten Valve Company, Chicago, died in that city on September 22.

J. M. Fitzgerald and Otto S. Flath, of the Alger Supply Company, Peoples Gas building, Chicago, have been appointed general sales agents of the National Electric Specialty Company, Toledo, Ohio.

Harry L. Allen, assistant fourth vice-president of the American Steel Foundries, died at Cleveland, August 31, at the age of 35 years. Mr. Allen had been with the company 15 years, coming to it at the time of its organization from the American Steel Castings Company.

The recent contracts placed with F. H. Lovell & Co. by the Navy Department, amounting to approximately \$1,500,000, have necessitated further additions to the company's plant at Arlington, including another two-story, 90 ft. by 100 ft. machine shop, in addition to the original machine shops, and an addition to the brass foundry.

E. N. Sanctuary, president of the Oxy-Acetylene Appliance Company, of New York, formerly engineer and secretary of the Bowers Southern Dredging Company, of Galveston, Tex., and an experienced construction engineer, has been commissioned a captain in the Engineer Officers' Reserve Corps, and has been assigned to the Washington office of S. M. Felton, director general of railways, in charge of the personnel for new railway troops being organized for service abroad.

H. McB. Parker, sales representative of the Hunt-Spiller Manufacturing Corporation, Boston, Mass., who entered the Officers' Training Camp at Plattsburg in May, and was thereafter detailed to special duty in the Submarine Signal Company, has enlisted in the United States Navy, and has been assigned to one of the United States destroyers, which has sailed for France. C. L. Galloway has been appointed sales representative of the Hunt-Spiller Manufacturing Corporation for the Northeastern district. Mr. Galloway for the last 18 years has been in the employ of the New York, New Haven & Hartford, in and about Boston, and serving in various capacities in the mechanical department.

TRADE PUBLICATIONS

THE BENJAMIN ELECTRIC MANUFACTURING COMPANY, Chicago, Ill., has issued a new Benjamin catalogue, No. S-2, which shows much that is new in the way of panel board construction, including an entirely new line of resident and dead front panel boards, which represent a great advance in construction and design. Particular attention has been made to arrange the pages so as to make the specifications and listing perfectly clear.

STORAGE BATTERIES FOR INDUSTRIAL LOCOMOTIVES.—The Edison Storage Battery Company, Orange, N. J., has recently issued bulletin 610 on the use of Edison storage batteries in lumber tractors, industrial locomotives and surface carriers. The first part of this bulletin is devoted to the improvement and economy in the operation of lumber mills and yards that may be obtained by the use of electric tractors, industrial locomotives and surface carriers, equipped with storage batteries, and to illustrations with descriptive captions of existing installations where such labor, power and time saving devices are in use in the lumber industry. The last few pages of the bulletin describe the construction and manufacture of the Edison storage battery. The Edison electric portable lighting outfit is described in another bulletin, No. 819. This consists of five cells, type B 2, completely assembled, fully charged and ready for service together with two properly guarded 12 candle power lamps with reflectors and with 11-ft. extension cords. One of these lamps can be used for 20 hours on one complete charge of the battery. Both of them will work for ten hours. This outfit is handy for lighting man-holes and other dark places where electric lights are not usually available. The complete weight of the outfit is 40 lb.

Railway Construction

CHESAPEAKE & OHIO.—This company proposes to build an enginehouse and shop building at Raleigh, W. Va., but the work has not yet been authorized.

CHICAGO & NORTH WESTERN.—This road is adding about 6,000 ft. of track to its switching yards at Antigo, Wis. Company forces are doing the work.

CHICAGO, BURLINGTON & QUINCY.—This company is asking for bids for the construction of a one-story, brick passenger station, 34 ft. by 132 ft., with concrete foundation, at Scottsbluff, Neb. The old passenger station at this point will be moved to a new site and remodeled to serve as a freight house.

DALLAS SOUTHWESTERN TRACTION.—E. D. Turner, president of this company and the Dallas Northwestern, is quoted as saying that construction work will be started at once on the electric line, between Dallas, Tex., and Irving. A contract for the construction work has been let to the Creek Construction Company, Supulpa, Okla. The line is eventually to be extended to Cleburne, a distance of about 60 miles. J. T. Witt, chief engineer, Dallas.

GRAND TRUNK.—A new station is to be built by this company at Orillia, Ont., 34 ft. by 142 ft., with umbrella sheds at each end, 22 ft. by 34 ft. The station will have concrete foundations to the grade line, with stone base to height of sills, 3 ft. 8½ in., and the super-structure above the base will be of brick.

GREEN BAY & EASTERN.—This road will be built from Green Bay, Wis., through Manitowoc to Sheboygan, 80 miles. The work will involve the handling of about 9,000 cu. yd. of material per mile, the construction of four 65-ft. bridges, two 50-ft. spans, two 30-ft. spans, and a number of small pile trestles. The bridge work will involve the use of 1,500,000 ft. b.m. of fir timber, 500,000 lineal ft. of piling, 300 tons of steel and 2,000 cu. yd. of concrete. The maximum grade will be 1.5 per cent, and the maximum curvature 6 deg. Steam motive power will be used for handling freight and gasoline electric cars for passenger and express service. The principal commodities the road will carry are cheese, milk, stock feed, live stock, building materials, implements, grain, farm produce and general merchandise. W. M. Willinger, president, Manitowoc, Wis.; Joseph A. Mesiroff, chief engineer, 407 Merrill building, Milwaukee, Wis. (April 13, page 808).

PHILADELPHIA & READING.—This company is building a 15-stall, one-story engine house at Reading, Pa., on a site located north of the shops on Sixth street. It will be 110 ft. wide and 418 ft. long. The entire structure is to be of reinforced concrete and brick; Henry E. Baton, Philadelphia, Pa., is the contractor.

SOUTHERN PACIFIC.—This road will double-track its line between Stockham, Ariz., and Polvo, six miles, the section being approximately three miles each way from the division terminal at Tucson. The work will be very light outside of track laying and ballasting.

CENTRAL TRAFFIC COMPTROLLER IN INDIA.—The Indian Railway Board has appointed a central traffic comptroller to deal with the question of the relative importance of different classes of traffic, and to control the distribution of rolling stock between the various systems. The officer appointed is Lieut.-Colonel H. A. Cameron, the traffic manager of the North Western Railway of India.

INCREASED RATES IN FAR EAST.—Increases of both through and local tariffs on the Chinese Eastern was given effect on July 28, according to an announcement in the Manchuria Daily News. With the local tariffs a 50 per cent increase was introduced in the passenger rates and a 100 per cent advance in the freight rates, except for cereals. The increase for the through freight for transportation over the Chinese Eastern, the Amur, and the Ussuri Railways is 200 per cent; that for the eastern (Harbin-Pogranichnaya) section 40 per cent; and that for the eastern (Harbin-Manchouli) section 100 per cent.

Railway Financial News

CHICAGO, ROCK ISLAND & PACIFIC.—James A. Patten, a director of the Rock Island company, has issued the following statement: "I have seen Mr. Amster's remarkable circular letter to the stockholders, in which he shows a positive genius for inaccuracy of statement. The attack upon J. N. Wallace is without any just foundation. Mr. Amster did not save the stockholders. He was only one of many who did this work. He did not reorganize the company, but the work was done by a committee of six, of which Mr. Amster was only one. Mr. Amster did offer to the stockholders a plan of reorganization, and in order to carry it out asked the stockholders to take \$25,000,000 of 8 per cent preferred rights or income bonds. His plan failed. Mr. Amster made a handsome profit out of the underwriting of the new preferred stock, and received \$25,000 for his services as a member of the reorganization. But this amount did not satisfy him, and when, in the interests of economy, it was thought best by the executive committee to pay no unnecessary salaries, and that no salary should be paid to the members and chairman of the executive committee or the chairman of the full board, he was the only person voting against this resolution. This whole matter could be adjusted to the satisfaction of Mr. Amster if they would continue him as chairman of the executive committee on a salary, and have him sit in the Chicago office, and dictate to Mr. Gorman how he should run the road, for which Mr. Amster has not had the necessary training and has not the native ability to fill, and I object seriously, as a stockholder of the Rock Island road, to having Mr. Amster manage its affairs. I just wish to ask Mr. Amster one general question: How much money did he make out of the reorganization of the Rock Island road? Lastly, the charge made by Mr. Amster that the old crowd is still in control is so untrue it is hardly worth replying to. It is evidently put out with a purpose of appealing to prejudice in order to obtain proxies so that he can obtain control of the road and manage it to suit himself. I sincerely trust that such a contingency is not possible, and that the stockholders of the road will prevent it."

Mr. Amster, in reply to the charges made against him by Mr. Patten, admits that he received \$25,000 as a member of the Rock Island reorganization committee, but contends that the minority stockholders secured a standing in the reorganization as the result of the work he did. "Of course I received \$25,000 as a member of the reorganization committee, as did the other members of that committee," his statement read. "Mr. Prosser, the chairman, received \$50,000. But for the three years' constant work that I did as chairman of the stockholders' protective committee I did not receive a penny. I have just mailed 1,400 checks, aggregating over \$32,000, returning in full the contributions of 1,400 stockholders, although in doing this I personally am out \$10,000 plus the expenses which I am now incurring in the effort to elect directors representative of the stockholders. The real reason for taking away my salary as chairman of the executive committee was probably because I opposed loading up the company with another coal company, which a brother-in-law of one of the leading Chicago directors and a friend of Mr. Patten wanted the company to buy about a year ago at \$200 an acre. The company could buy equally good coal land for under \$40 an acre."

DENVER & RIO GRANDE.—United States Marshal Thomas F. McCarty has levied on \$3,000,000 Liberty Loan bonds, the property of this company in possession of the Hanover National bank and the American Exchange bank, New York City. The seizure of these bonds was by order of Judge Learned Hand in a suit brought by Murray, Prentiss & Howland, attorneys for the Equitable Trust Company, trustees, judgment creditors against the Denver & Rio Grande. This action grows out of the suit of the Western Pacific against the Denver & Rio Grande to enforce payment of interest on bonds guaranteed by the latter, which was decided in favor of the Western Pacific by Judge Hand, who fixed damages at \$38,270,343. The bonds will be sold at public auction.

Railway Officers

Executive, Financial, Legal and Accounting

C. Manning has been appointed assistant to vice-president of the Grand Trunk, with office at Montreal, Que.

T. S. Ford, auditor of the Pittsburgh, Lisbon & Western, has been appointed also treasurer, with office at Lisbon, Ohio, vice C. P. Smith, resigned.

John G. Rodgers, whose appointment as assistant to president of the Pennsylvania Railroad has already been announced in these columns, was born on November 14, 1862. He was



J. G. Rodgers

educated at Lehigh University, and entered the service of the Pennsylvania Railroad on July 20, 1882. Mr. Rodgers served through the various grades in the engineering department until he reached the position of assistant engineer of construction, from which he was transferred in January, 1888, to the maintenance of way office at Altoona. He held various positions in that department until January, 1900, when he resigned as supervisor of the Philadelphia division to become superintendent of the New York, Philadelphia & Norfolk. In March, 1909, Mr. Rodgers was appointed assistant to the general manager of the Pennsylvania Railroad. On March 3, 1911, he was appointed general superintendent of the Northern division at Buffalo, N. Y., and now becomes assistant to president, as above noted.

George C. Jones, whose appointment as assistant to president of the Grand Trunk, with headquarters at Toronto, Ont., has already been announced in these columns, was born on September 24, 1860, at



G. C. Jones

Clyde, N. Y. He began railway work in 1874, and served until 1880, on roads now forming part of the Erie consecutively as messenger and yard clerk on the Atlantic & Great Western at Kent, Ohio, and as yard clerk and operator at various points on the New York, Pennsylvania & Ohio. In January, 1880, he was appointed operator and despatcher on the Cleveland, Columbus, Cincinnati & Indianapolis, now a part of the Cleveland, Cincinnati, Chicago & St. Louis, and from March, 1882, to August, 1883, was operator of the Western Union Telegraph Company. From August, 1883, to February, 1885, he was despatcher on the New York, Pennsylvania & Ohio, now a part of the Erie, and later served as despatcher on the Burlington, Cedar Rapids & Northern, now a part of the Chicago, Rock Island & Pacific. He was then despatcher and chief despatcher on the Wabash, and from January, 1896, to January, 1905, served first as assistant superin-

tendent and then as superintendent of the Grand Trunk. From January, 1905, to February, 1913, he was general manager of the Central Vermont; he then became vice-president of the same road, and since May, 1912, served also as vice-president of the Southern New England, until his recent appointment as assistant to president of the Grand Trunk, as above noted.

E. Marvin Underwood, whose appointment as general counsel of the Seaboard Air Line, with office at Norfolk, Va., has already been announced in these columns, was born on December 11, 1877, in Douglas county, Ga. After graduating from Vanderbilt University in 1900, he attended law school, receiving his degree of bachelor of laws in 1902. He then spent the following year in studies at the Faculté de Droit of the University of Paris, and upon his return to this country began the practice of law at Atlanta, Ga. He later became a member of the firm of King, Spalding & Underwood, of that city, and as such engaged in railroad practice, representing, among other companies, the Seaboard Air Line Railway. On February 24, 1914, he was appointed assistant attorney-general of the United States and as such represented the government in a number of important litigations before the Supreme Court of the United States, notably the case in which the constitutionality of the Adamson Law was upheld and the Pacific Terminal Case.

George Reeder has been appointed auditor of the Gulf, Florida & Alabama, with office at Pensacola, Fla., vice J. P. Smith.

E. F. Blomeyer, general manager of the Ann Arbor, with headquarters at Toledo, Ohio, has also been appointed vice-president, effective September 1.

Operating

Alexander M. Parker, who has been appointed superintendent of the Camden Terminal division of the Pennsylvania Railroad, and the West Jersey & Seashore Railroad, with headquarters at Camden, N. J., as has already been announced in these columns, was born on June 25, 1870, at Carlisle, Cumberland county, Pa., and was educated at Dickinson College. He entered the service of the Pennsylvania Railroad in 1888 as rodman, in which capacity and subsequent higher ones he was engaged for several years on survey work. In 1891 he was transferred to the assistant engineer's office on the Philadelphia division, and was later transferred to the office of the principal assistant engineer at Altoona. In 1892 he was appointed assistant supervisor of the Philadelphia division at Lancaster, and four years later was transferred as assistant supervisor to the Philadelphia yards. He was appointed supervisor at Tyrone in 1897, and subsequently served in the same capacity on the Frederick, the Schuylkill and the New York divisions, becoming assistant to the principal assistant engineer at Jersey City, N. J., in 1903. He was appointed principal as-



E. M. Underwood



A. M. Parker

sistant engineer in 1905, and upon the organization of the Hudson division at New York in 1909, Mr. Parker was appointed superintendent. On January 1, 1912, he was transferred as superintendent to the Allegheny division, with headquarters at Oil City, Pa., which position he held until his recent appointment as superintendent of the Camden Terminal division and the West Jersey & Seashore, as above noted.

Paul L. Grove, who has been appointed superintendent of the Delaware division of the Philadelphia, Baltimore & Washington, with office at Wilmington, Del., was born on October 3, 1878, at Altoona, Pa., and was educated in the public schools of that city. From May 1, 1894, to December 1, 1899, he was employed by the Pennsylvania Railroad as messenger and machinist apprentice in the Altoona shops. On February 1, 1902, he was transferred to the shops at Columbia, Pa., as inspector, and in October, 1904, became shop foreman on the Bedford division. He was promoted to assistant master mechanic of the Altoona machine shops on July 1, 1905, and was made assistant engineer of motive power on the Buffalo division in September, 1910. He was promoted on December 1, 1913, to master mechanic on the Williamsport division; in October, 1914, he was transferred to the Renovo division, and on July 1, 1916, he was again transferred to the Philadelphia Terminal division, in charge of the West Philadelphia shops, and now becomes superintendent of the Delaware division of the Philadelphia, Baltimore & Washington, with headquarters at Wilmington, Del.

Andrew J. Whitney, who has been appointed general superintendent of the Northern division of the Pennsylvania Railroad, with headquarters at Buffalo, N. Y., as has already been

announced in these columns, was born on October 11, 1862, at Harrisburg, Pa., and was educated in the public schools and the Harrisburg Academy. He entered the service of the Pennsylvania Railroad in June, 1881, as a rodman, and was engaged on the construction of the Lewisburg & Tyrone Railroad and the Schuylkill Valley Railroad. In May, 1886, he was transferred to the maintenance of way department, at York, Pa., on the Frederick division, as engineer right of way; he subsequently was assigned to the Altoona office, and on February 1, 1889, was appointed assistant supervisor at Washington, D. C. Mr. Whitney was promoted to supervisor on the Tyrone division at Tyrone, Pa., in May, 1893, following which he served consecutively as supervisor at Pittsburgh yard, assistant engineer of the West Penn division, and acting superintendent of the same division. On June 1, 1903, he was appointed assistant engineer of the West Jersey & Seashore; and in May, 1905, was made principal assistant engineer of the Pennsylvania Railroad division. He was appointed superintendent of the Delaware division of the Philadelphia, Baltimore & Washington at Wilmington, Del., in April, 1907, and



P. L. Grove



A. J. Whitney

was made superintendent of the Maryland division in January, 1910, which position he held until his recent appointment as general superintendent of the Northern division of the Pennsylvania Railroad, as above noted.

O. R. Belcher has been appointed superintendent of the Nevada-California-Oregon, with headquarters at Alturas, Cal., vice J. W. Ward, resigned.

E. T. Mulquin has been appointed chief dispatcher of the Second district of the St. Louis Southwestern, with office at Pine Bluff, Ark., vice C. Dancy, resigned.

John L. Wilkes, formerly chief dispatcher of the Illinois Central, at Princeton, Ky., and more recently out of railway service, has been appointed assistant superintendent of the Nashville, Chattanooga & St. Louis, at Atlanta, Ga.

P. C. Byrne, superintendent of the Alabama & North Western, has been appointed general superintendent in full charge of operation and maintenance, with headquarters at Mobile, Ala. The office of superintendent has been abolished.

O. W. Campbell has been appointed assistant to chief operating officer of the Missouri, Kansas & Texas, and the Missouri, Kansas & Texas Railway of Texas, with headquarters at Dallas, Tex., vice C. G. Elliott, resigned to engage in other business. Effective October 1.

R. E. Laidlow has been appointed superintendent of terminals of the Michigan Central at Detroit, Mich., succeeding J. L. McKee, resigned to accept service with another company; and W. A. Keavy has been appointed assistant superintendent of terminals at Detroit, succeeding Mr. Laidlow, effective September 15.

Traffic

S. J. Witt has been appointed general agent of the Akron, Canton & Youngstown, with offices at Akron, Ohio.

George S. Harlan has been appointed division freight agent of the Baltimore & Ohio, with headquarters at Baltimore, Md.

L. F. Root has been appointed commercial agent of the Cincinnati, Indianapolis & Western at Indianapolis, Ind., succeeding P. M. Havens, promoted, effective September 8.

J. A. Cox has been appointed commercial agent of the Galveston, Houston & Henderson, with headquarters at Houston, Tex., succeeding J. M. Lamb, resigned to enter military service.

J. S. Taber, freight agent of the Texas & Pacific, with headquarters at Abilene, Tex., has been appointed commercial agent, with the same headquarters. He will also continue his duties as freight agent.

M. A. Patterson, assistant general freight agent of the Chicago, Rock Island & Pacific at Chicago, has been promoted to general freight agent, with office at Chicago, succeeding H. A. Snyder, resigned, and Carl R. Maier has been appointed assistant general freight agent, with office at Chicago.

James P. Anderson, general agent of the Pennsylvania Railroad at Philadelphia, Pa., has been promoted to passenger traffic manager of the Pennsylvania Lines East of Pittsburgh and Erie, succeeding George W. Boyd, deceased; Oliver T. Boyd, division passenger agent at New York, has been promoted to general passenger agent of the Pennsylvania Railroad Lines East of Pittsburgh, with headquarters at Philadelphia; William Pedrick, Jr., division passenger agent at Baltimore, Md., succeeds Mr. Boyd as division passenger agent at New York; A. E. Buchanan, division passenger agent at Harrisburg, Pa., has been appointed division passenger agent at Baltimore, and N. S. Longaker, district passenger solicitor at Philadelphia, has been promoted to division passenger agent at Harrisburg. Effective October 1.

H. A. Snyder, general freight agent of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has retired. Mr. Snyder was born at Pottsville, Pa., on June 23, 1857, and entered railroad service with the Philadelphia & Reading in 1876, as a clerk in the freight office in that city. He was later transferred to the general freight office at Philadelphia, and in 1888, when the Philadelphia & Reading opened an office at Chicago he was appointed general western agent, with headquarters there. He was appointed general agent of the Chicago, Rock Island &

Pacific, at Omaha, Neb., in 1889, and on January 1, 1897, was promoted to assistant general freight agent, with headquarters at Chicago. He was appointed general freight agent on January 1, 1910. He was in railroad service for 41 years, 28 of which were with the Rock Island.

W. E. Duperow, whose appointment as general passenger agent of the Grand Trunk Pacific and the Canadian Government Railways, with headquarters at Winnipeg, Man., has already been announced

in these columns, was born in 1872, at Stratford, Ont., and in 1893 entered the service of the Grand Trunk. He held various positions in the passenger traffic department until 1902, and then for five years was general manager of the Huntsville, Lake of Bays and Lake Simcoe Navigation Company, at Huntsville, Ont. He returned to the service of the Grand Trunk as traveling passenger agent at Toronto, and in 1910 was appointed city passenger and ticket agent at Victoria, B. C.

Two years later he became general agent at Vancouver, and in 1914 was appointed assistant general passenger agent of the Grand Trunk Pacific. He subsequently was appointed assistant general passenger agent also of the Canadian Government Railways, and now becomes general passenger agent of both roads, as above noted.



W. E. Duperow

Engineering and Rolling Stock

R. J. Williams has been appointed superintendent of motive power of the Pere Marquette, with headquarters at Detroit, Mich., succeeding W. L. Kellogg, resigned; effective October 1.

The signal and telephone departments of the Western Maryland have been combined, and the title of E. E. Bradley, signal engineer at Baltimore, Md., has been changed to signal and telephone engineer.

H. C. Eich, master mechanic at the Burnside, Chicago, shops of the Illinois Central, has been appointed superintendent of motive power of the Chicago Great Western, with headquarters at Oelwein, Iowa, succeeding G. M. Crownover, resigned.

Herbert E. Morgan, pilot signal engineer in the valuation department of the Illinois Central, has been appointed signal engineer, succeeding W. M. Vandersluis, who is now a captain in the Engineering Corps, and is stationed at Ft. Leavenworth, Kan.

H. C. May, superintendent of motive power of the Lehigh Valley at South Bethlehem, Pa., has been appointed to the same position on the Chicago, Indianapolis & Louisville, with office at La Fayette, Ind., succeeding C. P. Burgman, assigned to other duties.

W. J. Bennett, assistant superintendent of motive power on the Denver & Rio Grande, at Denver, Colo., has been appointed superintendent of the motive power and car departments, with the same headquarters, effective September 20, succeeding J. F. Enright, deceased.

J. B. Diven, assistant engineer of motive power of the New Jersey division of the Pennsylvania Railroad at New York, has been appointed master mechanic of the Philadelphia terminal division, with office at West Philadelphia, Pa., succeeding P. L. Grove, promoted to superintendent of the Delaware division, with office at Wilmington, Del. James Young, Jr., assistant master mechanic of the Philadelphia, Baltimore & Washington, at Wilmington, Del., succeeds Mr. Diven; J. H. Fulmor, master mechanic of the Pennsylvania Railroad at Mount Carbon, Pa., has been appointed inspector in the office of the superintendent of motive power, Eastern Pennsylvania division, with headquar-

ters at Altoona; and C. J. Halliwell, inspector in the office of the general superintendent of motive power at Altoona, succeeds Mr. Fulmor. F. E. Marsh, assistant master mechanic at Altoona, has been appointed master mechanic of the New York, Philadelphia & Norfolk, with office at Cape Charles City, Va., succeeding A. W. Byron, granted leave of absence to enter military service at Camp Oglethorpe, Ga., and C. W. Burket has been appointed assistant master mechanic of the Monongahela division of the Pennsylvania, with office at South Pittsburgh, Pa., succeeding E. H. Newbury, transferred to shop inspector in the office of the superintendent of motive power at Pittsburgh.

W. H. Sample, whose appointment as superintendent of motive power of the Grand Trunk, with headquarters at Montreal, Quebec, has already been announced in these columns, was born in 1864, at Altoona, N. Y., and was educated at the high school of his native town. He began railway work in 1882, as fireman on the Central Vermont, and in 1886 was promoted to engineman. From 1887 to 1890, he served on the Santa Fe System as engineman, and then returned to the Central Vermont. In 1901 he was appointed road foreman of engines, remaining in that position until 1906. He then entered the service of the United Fruit Company as superintendent of motive power and car departments, on the Northern Central Railway of Costa Rica, Central America, resigning from that position in 1911 to go to the Grand Trunk as master mechanic on the Ottawa division. He was transferred as master mechanic in 1914 to the western lines, and in 1916 was again transferred in the same capacity to the eastern lines.



W. H. Sample

Purchasing

G. H. Walters, engineer of tests in the stores department of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., has been appointed assistant purchasing agent, with office at Chicago, succeeding A. J. Jennings, resigned.

F. B. MacSwain, storeman on the Canadian Pacific at Ogden, Alta., has been appointed storekeeper, with headquarters at Calgary, succeeding G. F. Rosengren, transferred to Lethbridge. N. C. Stibbs, storekeeper at Lethbridge, has been transferred to Nelson, B. C., succeeding D. S. Schofield, transferred to Revelstoke. T. W. Madden, storekeeper at Revelstoke, has been transferred to Coquitlam.

Special

W. H. Howard, secretary of the Southeastern Passenger Association for several years, with office at Atlanta, Ga., has been elected chairman of the association, succeeding the late Joseph Richardson.

Railway Officers in Military Service

H. W. Young, assistant engineer on the Union Pacific, has been appointed captain in the Eighth Regiment, Engineering Corps, United States Army.

E. R. Reynolds, until recently general baggage agent of the Chicago Great Western at Chicago, is now a captain in the National Army at Camp Grant, Ill.

Byron L. Kelso, until recently assistant engineer in the valuation department of the Chicago, Burlington & Quincy, at Chicago, has received a commission as captain in the Engineer Officers' Reserve Corps.

W. A. Hill, assistant engineer in the valuation department of the Chicago, Burlington & Quincy, at Chicago, has been commissioned major in the Engineer Officers' Reserve Corps, but

has not yet been called to service. T. R. Brunson, also an assistant engineer in the valuation department of the Burlington at Chicago, is now at Fort Sheridan, Ill., in the second officers' training camp.

Paul T. Marwick, secretary to President S. M. Felton, of the Chicago Great Western, has been transferred from Chicago to Washington as secretary to Mr. Felton as director general of railways, Corps of Engineers, War Department.

OBITUARY

George W. Boyd, passenger traffic manager of the Pennsylvania Railroad, Lines East of Pittsburgh, with office at Philadelphia, Pa., died on September 22 at his summer home at Cape May, N. J. He was born on August 1, 1848, at Indianapolis, Ind., and began railway work in 1863, in the freight department at Indianapolis of the Cleveland, Columbus, Cincinnati & Indianapolis, now the Cleveland, Cincinnati, Chicago & St. Louis, and for several years he served as clerk of the freight department. In June, 1872, he was appointed cashier of the passenger department of the Pennsylvania Railroad, remaining in that position until January, 1874, when he was promoted to chief clerk. From January, 1882, to June, 1903, he was assistant general passenger agent of the same road, and then was promoted to general passenger agent, which position he held until March 1, 1913, when he was appointed passenger traffic manager.



G. W. Boyd

Edward Stanton Koller, vice-president and general manager of the Colorado & Southern, whose death was announced in the *Railway Age Gazette* of September 7, was born at New Freedom, Pa., on October 18, 1864. He entered railway service with the Pennsylvania in 1882 as a telegraph operator, and clerk in the office of the division superintendent at Harrisburg, and four years later entered the employ of the Chicago, Burlington & Quincy in a similar capacity. In March, 1892, he was promoted to traveling auditor, and in March, 1903, he became chief clerk in the division superintendent's office at Lincoln, Neb. On April 1, 1905, he was appointed trainmaster of the Lincoln division, and later served successively

until September 1, 1912, as assistant superintendent of the same division, superintendent of the McCook division, and general superintendent of the Illinois district, with headquarters at Galesburg, Ill. On the latter date he was promoted to assistant general manager of the lines east of the Missouri river, and on August 1, 1913, was transferred to the lines west of the Missouri river, with headquarters at Omaha, Neb. On March 1, 1915, he was appointed general manager of the Colorado & Southern at Denver, Colo., and on March 1, 1916, was elected vice-president in addition, in which capacity he served until his death.



E. S. Koller